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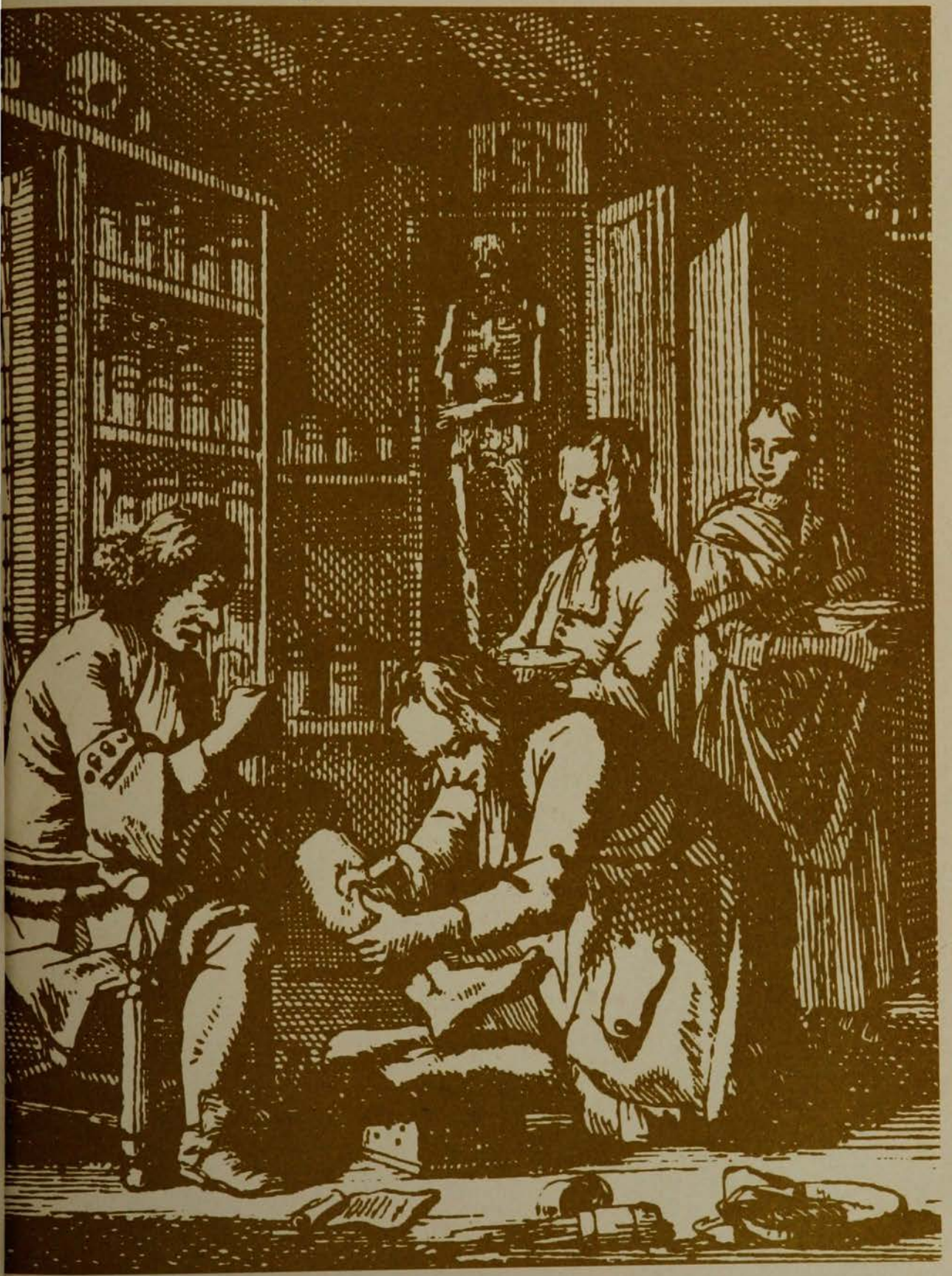

MEDICAL JOURNAL

VOL. 44, NO. 4, MAY, 1974

THE UNIVERSITY OF WESTERN ONTARIO

Contents

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CONTRIBUTIONS will be accepted with the understanding that they are made solely to this publication. Articles should be of practical value to students and medical practitioners. Original research work is most welcome. Articles should not be longer than 3,000 words, and we will more readily accept those of shorter length. Introduction and summary of conclusions, should be included. Drawings and photographs will be accepted, the former to be in black ink and drawn clearly on white cardboard.

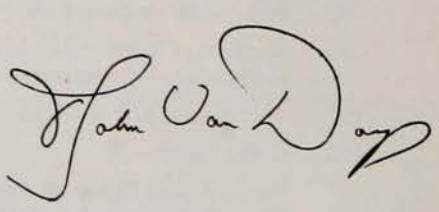
All articles submitted must be typewritten, on one side of paper only, with double spacing and two inch margins on each side. Canadian Press (American) spelling must be adhered to. The format for references is as follows: For books: author(s): title of book, publisher, place, year. For Journals: author(s): title of article, name of Journal (abbreviated as in the World List of Scientific Periodicals), volume: page, year.

Editorial

I suppose that I am really a sucker for statistics, but even the most incredulous souls cannot fail to be moved by certain figures presented in our Bacteriology course. Some 200 million people are infested with worms, and tuberculosis still kills about five million people every year. According to the Renegade Report on Poverty in Canada the life expectancy of a Canadian Indian is thirty-five years while that of an Eskimo is twenty. In 1971 nearly 35,000 Montreal school children were examined in a survey conducted jointly by the City Health Department and the Catholic School Commission. More than half of these children turned out to be physically ill and ten percent required immediate hospitalization. Furthermore as will be pointed out in the Consumer Reports' article in this issue, while Canada's standard of living may be among the highest in the world, her perinatal mortality rates do not rank amongst the lowest.

There is also an article in this issue about the sparseness of government funding for medical research in Canada, but I would that were our only sin. As a nation we have been richly blest; as a people we have many talents, but there is no reason to believe that it shall be any different with us than it was with the servant, in the parable, who never used the talent which was given him. To seek new knowledge is vital; we shall stand still and lose our intellectual integrity if we desist from that search: but if we fail to maximize the therapeutic potential of what we have already learned, then we shall be going backwards and for that no stripes could ever be too heavy. If medicine has triumphed over the obscurity surrounding the aetiology of a disease or has devised a therapeutic regimen for its cure, then surely it would be a great scandal if she should yield to economics the victory just wrested from nature.

Those 3,500 Montreal school children who needed hospitalization, by and large, needed it for nothing more obscure than the sequelae of malnutrition: and that is the most curable and preventable disease of all. That knowledge is older than Hippocrates and yet malnutrition continues to be the leading cause of death in our world. We may have come a long way since Hippocrates but it is also true that, in a very real sense, we have not moved at all: like the servant who buried his talent . . . when the reckoning came it was taken away from him and he was cast into damnation.



* * *

Junior Interneships '74-'75

It is expected that the degree of Doctor of Medicine will be granted to all or most of these students at Convocation, June 7th, 1974. (Rotating Interneship unless otherwise stated.)

Adams, Howard Franklyn—Montreal General Hospital, Montreal, Quebec.

Aldis, Hugh Warren—McMaster University Integrated Program, Hamilton, Ontario. Straight Surgery.

Anderson, Richard Raymond—University of Western Ontario Integrated Program, London, Ontario. Straight Surgery.

Austin, Michael Joseph—Royal Columbian Hospital, New Westminster, B.C.

Aylett, Alan Archie Andrew—St. Joseph's Hospital, London, Ontario.

Beach, Anne Elizabeth—Women's College, Toronto, Ontario. Family Medicine.

Beecroft, Wayne Arthur—St. Michael's Hospital, Toronto, Ontario.

Biggs, Michael Herbert—North York General Hospital, Toronto, Ontario.

Bixenman, Wayne William—University of Western Ontario Integrated Program, London, Ontario. Straight Medicine.

Bloch, Petr Gunsberger (Peter)—North York General Hospital, Toronto, Ontario.

Bourne, Mary Elizabeth—North York General Hospital, Toronto, Ontario.

Brady, Stephen Clarke—Royal Columbian Hospital, New Westminster, B.C.

Bright, Susan Elizabeth—Dalhousie University Integrated Program, Halifax, Nova Scotia. Family Medicine.

Brooks, Terry Lynn—Victoria Hospital, London, Ontario. Family Medicine.

Bruckschwaiger, Christian—University of Western Ontario Integrated Program, London, Ontario. Family Medicine.

Cairncross, John Gregory—Toronto General Hospital, Toronto, Ontario. Straight Medicine.

Campbell, John Vincent Garfield—Royal Jubilee Hospital, Victoria, B.C.

Clements, Nigel David—Toronto General Hospital, Toronto, Ontario. Straight Surgery.

Cordeiro, Cesar Nunes—Toronto Western Hospital, Toronto, Ontario.

Cumming, Alice Mildred—University of Western Ontario Integrated Program, London, Ontario. Family Medicine.

Davidson, Barry Hilton—McMaster University Integrated Program, Hamilton, Ontario. Straight Medicine (Mixed).

De Rose, Gaetano (Guy)—Victoria Hospital, London, Ontario.

Digges, Deborah Dean—Toronto Western Hospital, Toronto, Ontario.

Driedger, Harry John—St. Joseph's Hospital, London, Ontario.

Drobac, Milutin (Milton)—Toronto General Hospital, Toronto, Ontario. Straight Medicine.

Dundas, George Stephen—Calgary General Hospital, Calgary, Alberta. Family Medicine.

Erez, Hanna—New Mount Sinai Hospital, Toronto, Ontario.

Fetterly, Paul John Thomas—Dalhousie University Integrated Program, Halifax, Nova Scotia.

Fratesi, Sante Joseph Paul—Victoria Hospital, London, Ontario.

Foxen, John—University of Western Ontario Integrated Program, London, Ontario. Family Medicine.

Gatien, Raymond Alfred—Jewish General Hospital, Montreal, Quebec.

Geddes, John Alex—St. Joseph's Hospital, London, Ontario. Family Medicine.

Goodge, John Douglas—University of Western Ontario Integrated Program, London, Ontario. Family Medicine.

Grace, Archie Norman—University of Alberta, Edmonton, Alberta.

Graydon, John William—Victoria Hospital, London, Ontario. Elective.

Greenfield, Douglas Bruce—University of Western Ontario Integrated Program, London, Ontario. Family Medicine.

Growse, Michael Joseph—Manitoba University Integrated Program, Winnipeg, Manitoba.

Gulamhusein, Sajadhussein Sadikali—St. Joseph's Hospital, London, Ontario.

Haddad, Richard Gordon—Victoria Hospital, London, Ontario.

Hayley, John Hargreaves—Ottawa Civic Hospital, Ottawa, Ontario.

Hoggarth, Robert Bruce—North York General Hospital, Toronto, Ontario.

Hunkin, John Bradley—Dalhousie University Integrated Program, Halifax, Nova Scotia.

Hunter, Joseph Barry—St. Joseph's Hospital, London, Ontario.

Johnson, Leonard Stephen—Montreal General Hospital, Montreal, Quebec. Mixed.

Johnston, Peter Sean—Dalhousie University Integrated Program, Halifax, Nova Scotia. Family Medicine.

Kocha, Walter Ilarion—Royal Victoria Hospital, Montreal, Quebec. Straight Medicine.

Lam, Man Lung (Arthur)—St. Joseph's Hospital, London, Ontario.

Law, Hugo Kwok-Cheung—Scarborough General Hospital, Toronto, Ontario.

Lim, Bing—McMaster University Integrated Program, Hamilton, Ontario. Straight Medicine.

Lloyd, David Jeremy—Ottawa Civic Hospital, Ottawa, Ontario.

Long, Barry Herbert—Victoria Hospital, London, Ontario. Mixed.

Loynes, Richard James Shore—Royal Victoria Hospital, Montreal, Quebec. Straight Medicine.

MacDonald, Peter John Charles—Calgary General Hospital, Calgary, Alberta. Family Medicine.

McKillop, Barry Allen—University of Western Ontario Integrated Program, London, Ontario. Straight Surgery.

Mackie, Carl Clarence—University of Western Ontario Integrated Program, London, Ontario, Family Medicine.

Mayr, Patricia Jean Moyer—Victoria Hospital, London, Ontario.

Mehta, Adi Erach—University of Western Ontario Integrated Program, London, Ontario. Straight Medicine.

Michiels, Paul Joseph—Ottawa Civic Hospital, Ottawa, Ontario.

Minielly, Richard Wesley—St. Joseph's Hospital, London, Ontario.

Mithoowani, Mohamed Hussein Ahmed—St. Joseph's Hospital, London, Ontario.

Nolewajka, André Jozef—University of Western Ontario Integrated Program, London, Ontario. Straight Medicine.

Paterson, David James—Ottawa Civic Hospital, Ottawa, Ontario.

Patrick, Lawrence Thomas—Jewish General Hospital, Montreal, Quebec.

Payne, John Christopher—University of Western Ontario Integrated Program, London, Ontario. Family Medicine.

Perkin, Gary William—St. Joseph's Hospital, London, Ontario.

Phillips, Thomas William—Victoria Hospital, London, Ontario. Mixed.

Pleta, Adele Mary—Dalhousie University Integrated Program, Halifax, Nova Scotia.

Pook, John Joseph—St. Joseph's Hospital, London, Ontario.

Puodziukas, Julius George—Scarborough General Hospital, Toronto, Ontario.

Remington, David Brian—Grady Hospital, Atlanta, Georgia. Straight Medicine.

Richardson, Bryan Stanley—Manitoba University Integrated Program, Winnipeg, Manitoba.

Sawa, Gordon Michael John—Toronto General Hospital, Toronto, Ontario. Straight Medicine.

Schaefer, John Charles—McMaster University Integrated Program, Hamilton, Ontario. Family Medicine.

Schemmer, Robert Jens—Sunnybrook Hospital, Toronto, Ontario. Straight Medicine.

Scholz, John Frederick—University of Western Ontario Integrated Program, London, Ontario. Straight Psychiatry.

Sexton, Frederick George—Scarborough General Hospital, Toronto, Ontario.

Simmons, John Morris—St. Joseph's Hospital, London, Ontario.

Smith, Derryck Harold—Ottawa General Hospital, Ottawa, Ontario.

Tam, Hon-Yin Albert—St. Joseph's Hospital, London, Ontario.

Thompson, Maureen Elizabeth—Dalhousie University Integrated Program, Halifax, Nova Scotia.

Tiedje, Mary Ellen—McMaster University Integrated Program, Hamilton, Ontario. Straight Medicine (Mixed).

Tse, Wing Kin—Scarborough General Hospital, Toronto, Ontario.

Vance, Alan Ross—University of Western Ontario Integrated Program, London, Ontario. Family Medicine.

Vilos, Georgios Angelos (George)—University of Western Ontario Integrated Program, London, Ontario. Straight Medicine.

Wahby, Allen James—Victoria Hospital, London, Ontario.

Wai, Chi-tak (Patrick)—Toronto General Hospital, Toronto, Ontario.

Walker, Dennis Martin—St. Paul's Hospital, Vancouver, B.C.

Walker, James Douglas—Wellesley Hospital, Toronto, Ontario.

Watters, Conrad William Lawrence—Calgary General Hospital, Calgary, Alberta. Family Medicine.

Weber, Hans-Jurgen Emil—Scarborough General Hospital, Toronto, Ontario.

Wong, Godfrey Long—St. Joseph's Hospital, London, Ontario.

Wooster, Douglas Lawrence—Royal Alexandria Hospital, Edmonton, Alberta.

One of the saddest things I ever read was a description of a day in the life of a geriatric multiple sclerosis patient. This lady, whose intelligence was well above average, was almost totally incapacitated, physically. Her complaint was that to the people taking care of her, her physical condition defined her mental condition. She described how, in the middle of a spirited debate with a visiting relative, a young nurse walked by, patted her on the shoulder and said 'soothingly': "Are we being a good girl today?"

—*Margaret McCaffery, ed.,* The Canadian Family Physician, *Dec. 1973*

Hypertensive Disorders ("Toxemia") of Pregnancy

Leslie Bertram

A disorder associated with hypertension, proteinuria and edema has long been known in pregnant women. Speculations as to its etiology have been made for hundreds of years. It was named "toxemia of pregnancy", a misnomer based on the nineteenth and twentieth century search for a mythical toxin. Recently, the term "toxemia" is being replaced by the term "hypertensive disorders of pregnancy".

The usual sequence of events is a rapid weight gain resulting from fluid retention, a rise in both systolic and diastolic pressures, and appearance of proteinuria and/or edema. In severe cases, there may be visual disturbances or a severe headache, a frequent forerunner of a convulsion. Epigastric pain, the result of a swollen liver with stretch of the capsule, is a serious sign. Glomerular filtration rate and renal blood flow are decreased while serum uric acid concentration is increased.

The pathologic alterations seem to be related to the arteriolar constriction and spasm which occur. Postmortem studies may show: 1. various degrees of cerebral edema and hemorrhage; 2. a typical glomerular lesion characterized by swelling of the endothelial cells which are filled with a fibrin-like material and which almost obstruct the capillary lumen; 3. irregular areas of congestion and necrosis in the subcapsular area of the liver; 4. constriction of retinal arterioles; 5. pulmonary edema and 6. placental infarcts.

An explanation of these hypertensive disorders of pregnancy must account for several factors:

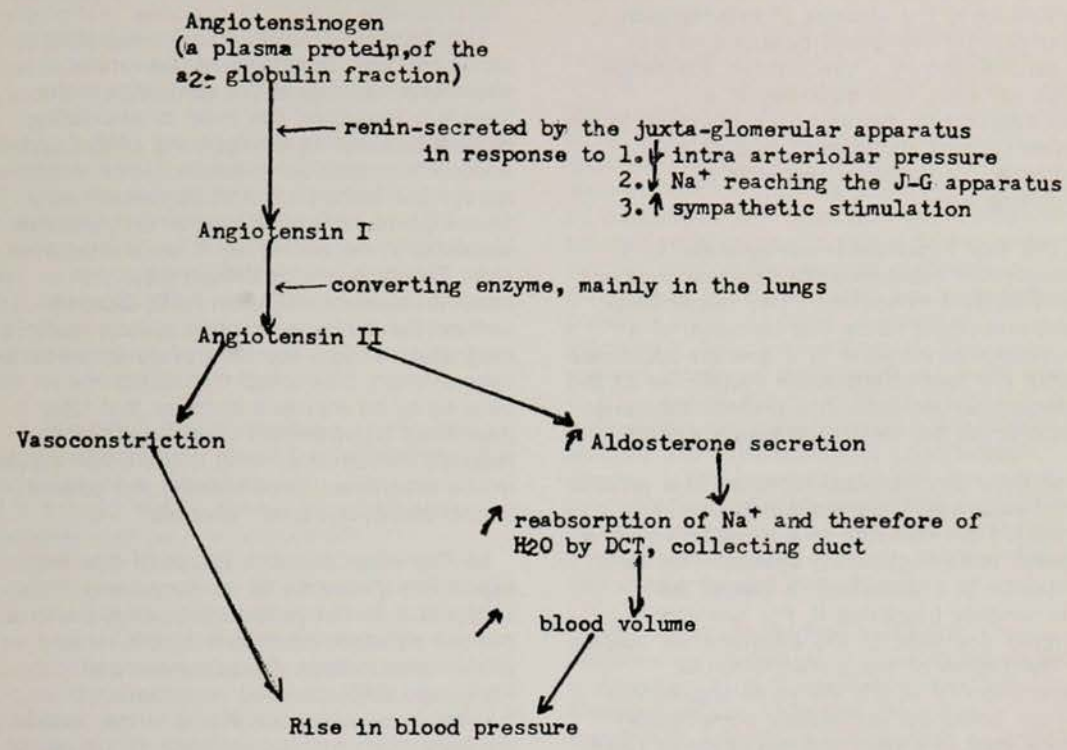
1. In its true form, "toxemia" is almost exclusively a disease of the first pregnancy; in the multipara it is usually superimposed on a predisposing factor such as renal disease or hypertensive vascular disease.
2. Among the prominent predisposing factors are diabetes mellitus, twins, obesity, antecedent hypertension, hydatid mole, hydramnios, hypertensive vascular disease and chronic renal disease.
3. The occurrence increases with the advance of the pregnancy.
4. It occurs after the twentieth week of gestation, although it may occur earlier with an hydatid mole.
5. The incidence is increased in the lower socioeconomic strata of society.
6. In the pure form of the disease, termination of pregnancy is usually followed by complete disappearance of the syndrome with no permanent effects.
7. It may first appear within the first twenty-four hours following delivery.

"Toxemia" of pregnancy has been called the "disease of theories" by many authors. A vast amount of research has gone into it but the etiology remains a mystery.

One of the major problems that exists is the confusion arising due to the lack of uniformity in the classification of the hypertensive disorders. An even more basic problem than classification arises in the accuracy of the results obtained. Seligman (1971) showed that blood pressure measured by the sphygmomanometric method could be very inaccurate (i.e. low) when compared to the actual values measured intra-arterially. This is probably due to change in the quality of the Korotkoff sounds in the "toxemic" patient. As these sounds are the basis of the sphygmomanometric technique, this may account for the occurrence of "eclampsia" in apparently normotensive patients. Relating severity of disease to the value of blood pressure may thus be questionable.

Despite, or perhaps because of, these problems, a myriad of theories has been proposed to account for the hypertensive disorders of pregnancy. Some of those that I have investigated include a physiological above-average hydration early in pregnancy, maternal-fetal incompatibility involving a single gene locus or multiple loci and resulting in antigen production by either fetus or mother; liver involvement based on increased total serum alkaline phosphatase levels; increased disseminated intravascular coagulation; malnutrition; excess trace metals, especially lead, causing an inhibition in placental oxidative metabolism; placental ischemia and finally, alterations in the renin-angiotensin system. This list comprises a random selection of theories based primarily on recent research.

Fig. 1: Renin-Angiotensin System



Of the above-mentioned theories, one that has a probable role is alteration of the renin-angiotensin system. I will attempt first to evaluate the renin-angiotensin system as to its role in the etiology of the hypertensive disorders of pregnancy, and second to outline a possible hypothesis showing a relationship between the renin-angiotensin system and several other theories.

The renin-angiotensin system primarily regulates blood pressure. Figure 1 outlines the system. Renin, a proteolytic enzyme, is secreted into the bloodstream by the juxta-glomerular apparatus of the kidney nephron in response to three alterations: 1) decrease in the intra-arteriolar pressure in the region of the juxta-glomerular cells, 2) decrease in sodium ions reaching the juxta-glomerular apparatus, or 3) increase in sympathetic stimulation. In the bloodstream, renin splits a plasma protein called angiotensinogen, releasing a decapeptide called angiotensin I. This is converted to the octapeptide angiotensin II by converting enzyme as the blood passes through the lungs. Angiotensin II exerts two effects, both of which cause an increase in blood pressure. Firstly, it stimulates the secretion of aldosterone, which causes increased reabsorption of sodium and water, increasing the blood volume and thus causing a rise in blood pressure. Most important, however, angiotensin II acts directly on arterioles, producing arteriolar constriction with a consequent rise in systolic and diastolic blood pressure.

In normal pregnancy a change occurs in the renin-angiotensin system. The levels of renin, renin substrate, and angiotensin are appreciably increased, especially during the latter half of pregnancy. As well, aldosterone secretion is also increased, probably due to the augmented renin-angiotensin system. It has been suggested that the elevated secretion of aldosterone during normal pregnancy affords protection against the natriuretic effect of progesterone. With this increased activity of the renin-angiotensin system, one might expect a subsequent rise in blood pressure. However, in an extensive survey on blood pressure in pregnancy, MacGillivray et al (1969) found that blood pressure in pregnancy is actually lower than in non-pregnant states, and rises as pregnancy progresses, reaching average non-pregnant values post-natally.

Why then, with an increase in the activity of the renin-angiotensin system does blood pressure not rise in the normal pregnancy? Evidence suggests that the vascular reactivity to angiotensin is considerably reduced in pregnancy.

Something obviously has gone awry in the hypertensive disorders of pregnancy. What defects could occur in the renin-angiotensin

system to cause hypertension? A variety of possibilities exist, one or more of which may contribute to the etiology of hypertension. Four much investigated possibilities are: 1) an increase in a vasopressor substance such as renin, 2) a decrease in a vasodepressor substance, 3) a decrease in the inactivation of angiotensin, and 4) an increased vasopressor response to angiotensin II.

The first hypothesis—an increase in a vasopressor substance—is complex and has been studied extensively. Two possibilities exist that could cause this increase: a) a physiological increase in a pressor substance within the renin-angiotensin system; or b) the pathological increase in a pressor substance extrinsic to the renin-angiotensin system.

a) By a physiological increase in a pressor substance within the renin-angiotensin system, I am referring to a hyperactivity of a normal renin-angiotensin system. This is in response to a pathology in one of the mechanisms triggering it. For example, a chronic decrease in the intravascular volume in the region of the juxta-glomerular apparatus (for which the renin-angiotensin system could not completely compensate) would lead to a continual secretion of renin. Subsequent formation of angiotensin II without any inhibiting feedback would lead to increasing vasoconstriction and hypertension. Smith (1970) studied cardiovascular alterations in "toxemia" and found a decrease in plasma volume compared with normal pregnancies. This possible decrease in intravascular volume occurs in spite of apparent fluid retention (in the form of edema). If malfunctioning causes abnormal distribution of body fluids (increasing the interstitial fluid volume while decreasing the intravascular volume) the normally functioning renin-angiotensin system would not get the negative feedback, and thus would not turn off.

A similar result would occur in chronic depression of sodium, especially in the region of the juxta-glomerular apparatus. A study of cation levels in human placentas showed lower levels of sodium in placentas of "toxemic" patients. Another article hypothesizes the hyperactivation of the renin-angiotensin system by a progesterone-induced sodium loss. Rabbits treated with progesterone only for twenty days showed a sharp rise in mean systolic pressure. However those treated with progesterone plus saline for ten days showed only a very slight increase in mean systolic pressure. This pressure rose steeply in the second ten day period when water was substituted for the saline. According to this hypothesis, sodium intake should be supplemented rather than the longstanding restriction treatment.

One problem in evaluating the hypothesis of an increase in activity of the renin-angiotensin system is the confusion in the literature regarding the level of circulating renin. Abnormal hypertriggering of the system implies increased renin levels. However renin assays are inaccurate and the results vary from high to normal to low. In fact, opinion seems to favor low renin levels rather than high. This appears to detract from the hypothesis. However when R. D. Gordon studied the renin-angiotensin system early in pregnancy, before the time of development of hypertension, they found that its activity seemed to be elevated in those that later developed hypertensive disorder. Thus the required elevation in renin could occur earlier in the pregnancy, predisposing the patient to the development of "toxemia".

b) The other possible cause of this first hypothesis (increase in a vasopressor substance) is the pathological increase in a pressor substance extrinsic to the renin-angiotensin system. Goretzlehner and Riethling (1968) isolated a vasopressor substance from venous blood, urine, decidua, amniotic fluid, and/or placenta of six out of nine cases of "toxemia" examined. No corresponding constrictive activity was found in the normal pregnant controls. Hunter and Howard (1961) isolated from the decidua of patients with hydatid mole with super-imposed "toxemia" a pressor substance (which they termed hysterotonin) which was not observed in normotensive molar pregnancies. They felt that hypoxia was responsible for the release of hysterotonin in the uterus in "toxemia"; and that renal ischemia, a secondary effect of hysterotonin, led to activation of the renin-angiotensin mechanism. In support of this theory, placental oxygen consumption in vitro has been found to be decreased in the placentas of "toxemic" patients when compared to normal placentas. As well, the maternal placental blood flow between thirty-eight weeks and term seems to be reduced by about two-thirds in "pre-eclampsia" and chronic hypertension. Indeed, placental ischemia due to reduced utero-placental circulation is thought by many to result in release of a pressor substance. This could cause consequent hypertensive disorders. Hodari produced the symptoms of "toxemia" in dogs by placing snug but not constricting Teflan bands around the uterine arteries before pregnancy. In pregnancy, the bands prevented a normal increase in uterine flow, thus creating a relative uterine ischemia, and the symptoms of "toxemia". This results in a vicious circle: reduced utero-placental

circulation leads to liberation of a vasopressor substance, which in turn leads to vasoconstriction, resulting in further reduction in circulation, and so on. One interesting question is "which comes first", the chicken (vasoconstriction) or the egg (ischemia)?

In summary, we have seen that one possible alteration of the renin-angiotensin system in the hypertensive disorders of pregnancy is an increase in a vasopressor substance. This increased vasopressor substance could be due either to a physiologic hyperactivity of the renin-angiotensin system because of pathology in the body, or it could be due to pathological vasopressor production outside the renin-angiotensin system.

A second possible alteration in the renin-angiotensin system could be a decrease in a vasodepressor substance. As stated earlier, it is thought that in normal pregnancy the vascular reactivity to angiotensin is considerably reduced. This reduction could possibly be due to a vasodepressor substance produced in the placenta which counteracts the effect of angiotensin. Some workers succeeded in isolating from mature human placentas a substance that lowered blood pressure and produced a marked relaxation in duodenal smooth muscle. The solubility, size and stability to proteases, temperature changes, and pH changes suggest that this active substance may be a prostaglandin or related substance. From dilution studies, less of this vasodepressor compound was demonstrated in the "toxemic" placenta than in the normal one. Some suggest that the placenta in "toxemia" may be damaged in such a way (for example, ischemia) that it is unable to synthesize as high quantities of the vasodepressor substance. The renin-angiotensin system, although possibly operating at normal levels, would still produce hypertension.

A third change producing the same effect is a decreased inactivation of angiotensin. This is to be distinguished from the second possibility in that here the angiotensin is inactivated before it can produce vasoconstriction. In contrast, the vasodepressor substance discussed above probably acts in an opposite direction to angiotensin and thus nullifies its effect. Talledo studied nineteen "toxemic" patients and found that their angiotensin inactivation was decreased from values of normal pregnancies. As he also found plasma renin decreased when compared to normal pregnancies, he inferred that endogenous levels of angiotensin may also be decreased. Thus a decrease in angiotensinase (an enzyme which breaks down angiotensin) could also occur, perhaps overcompensating. The result would be the same as an increase in angiotensin, i.e. hypertension.

The final possibility in the alteration of the renin-angiotensin system is an increased pressor *response* to angiotensin. This hypothesis has been much investigated and at the present time is quite popular. The hypertensive disorders of pregnancy, as distinct from chronic hypertension, appear to be associated with vascular hyperactivity to pressor substances. Talledo, Chesley and Zuspan studied the pressor response to angiotensin II and norepiphrine in thirteen patients, all in the third trimester of pregnancy. The "pre-eclamptic" patients showed increased sensitivity (i.e. larger rises in mean blood pressure) to infusions of angiotensin and norepinephrine. However, patients with uncomplicated hypertension reacted in the same way as did normotensive pregnant women. This increased sensitivity to angiotensin could account for normal or decreased values of circulating renin while still explaining the hypertension.

What could cause the increase in pressor response to angiotensin II? Some interesting work points in the direction of intracellular shifts of sodium. Burks studied dog mesenteric arteries in vitro before and after storage in various solutions. Data indicated a relationship between artery responsiveness and tissue levels of both sodium and potassium ions. The artery was hypotensive if the tissue levels of either ion fell below certain minimal values. If the tissue contained both ions but with neither in excess, the artery was normoresponsive. Most significant however was that if the artery contained a minimal level of potassium and an excess of sodium, the artery was hypertensive.

Along a similar line, Harris related arterial reactivity to sodium levels in the extracellular compartment. He hypothesized that mucopolysaccharides in the arterial wall are the site of sodium binding in the arterial extracellular compartment. His evidence is that after treating the arterial wall with hyaluronidase or ascorbic acid (which depolymerize the mucopolysaccharides from the wall), there was a decreased arterial response to constrictor agents. This parallels a decrease in the sodium content of the arterial segment and a consequent loss in the amount of rapidly exchangeable sodium ion. In contrast, increasing the amount of rapidly exchangeable sodium by raising the sodium concentration of the solution in which the artery was soaked, resulted in an increased sensitivity to vasopressor agents. The same result might be expected to occur if the mucopolysaccharide component in the arterial wall increased. Patients with hypertension,

though not specifically of pregnancy, have demonstrated such an increase. If this hypothesis is correct, then restricting the dietary intake of sodium would possibly decrease the extracellular exchangeable sodium, and thus might be helpful.

Up to this point, evidence has been presented to account for a change in the renin-angiotensin system producing vasoconstriction. Four hypotheses have been presented, one or more of which may contribute to the hypertensive effect. For example, a possible scheme interrelating two of the hypotheses is shown in Figure 2. A shift in the intracellular sodium content results in an increased pressor response of the vascular system when the renin-angiotensin system is activated. This leads to excessive vasoconstriction, thus decreasing the utero-placental circulation. The placenta becomes ischemic and releases a vasopressor substance, causing further vasoconstriction, placental ischemia, vasopressor release, and so on, instigating a vicious circle.

In extensive reading, it becomes apparent that more than just the renin-angiotensin system must be involved in the etiology of the hypertensive disorders of pregnancy. However, the renin-angiotensin system could possibly be the basic mechanism through which the other predisposing theories work. In the process of researching this topic, one becomes intrigued as to how some of the other theories might possibly tie in. If the reader has knowledge of the research into this etiology, he will share with me the yearning to see possible interrelationships. For example, a possible relationship involving the theory of placental ischemia has already been discussed. With this view in mind, I will now outline an interesting hypothesis of the interrelation of various theories in the etiology of the hypertensive disorders of pregnancy. This hypothesis was advanced by Page and is illustrated in Figure 3. Incorporated into this concept, one may see several of the theories described earlier. Examples are disseminated intravascular coagulation, sodium retention, placental ischemia and renin-angiotensin alterations.

Figure 3 also shows possible consequences superimposed on the concept of the vicious circle. The three major symptoms of "toxemia" are accounted for: hypertension as a result of vasoconstriction, proteinuria as a result of a leakage due to the glomerular endothelial lesions, and edema as a result of sodium retention. As well, various other clinical symptoms discussed at the beginning

Fig. 2: A Possible Relationship Between Theories Accounting for Hypertensive Disorders of Pregnancy

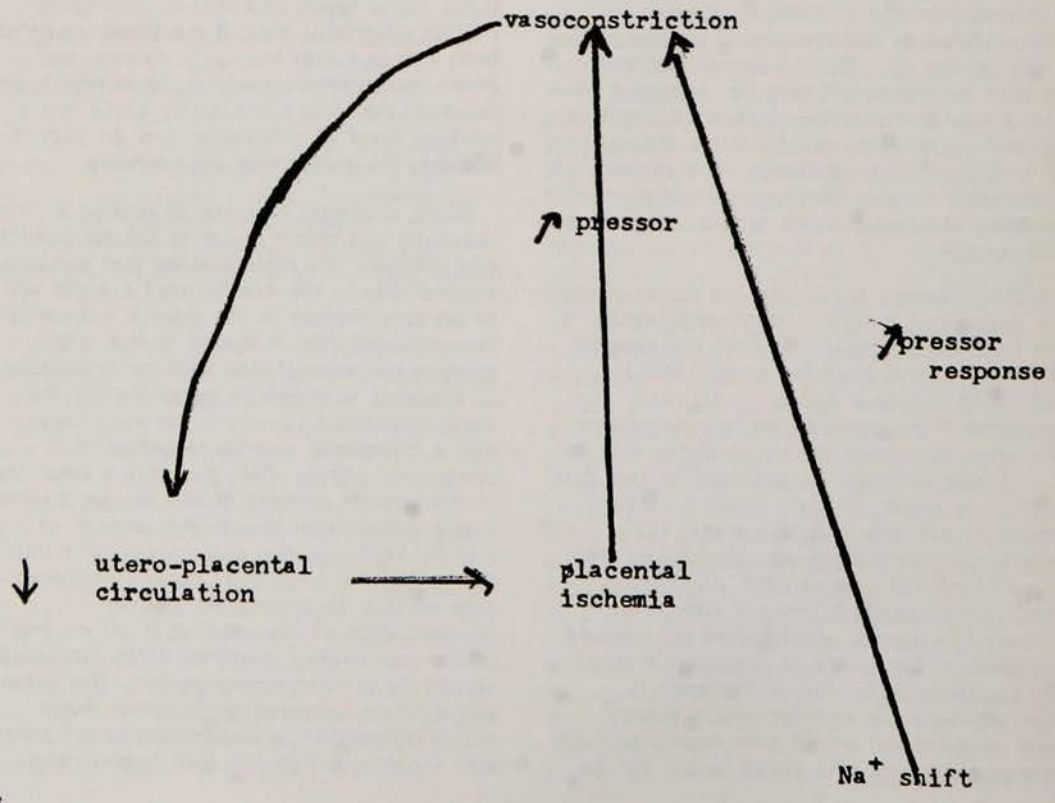
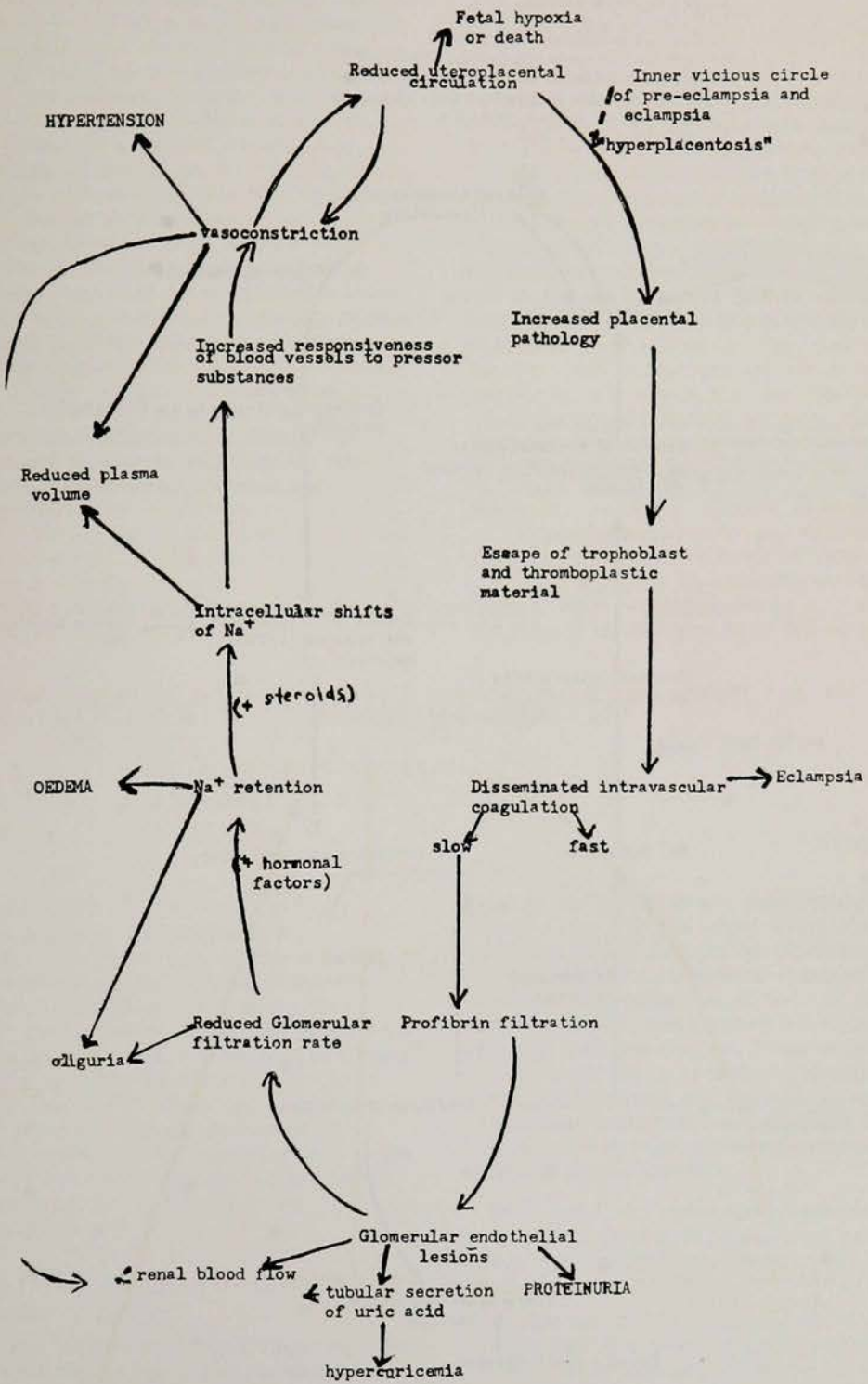
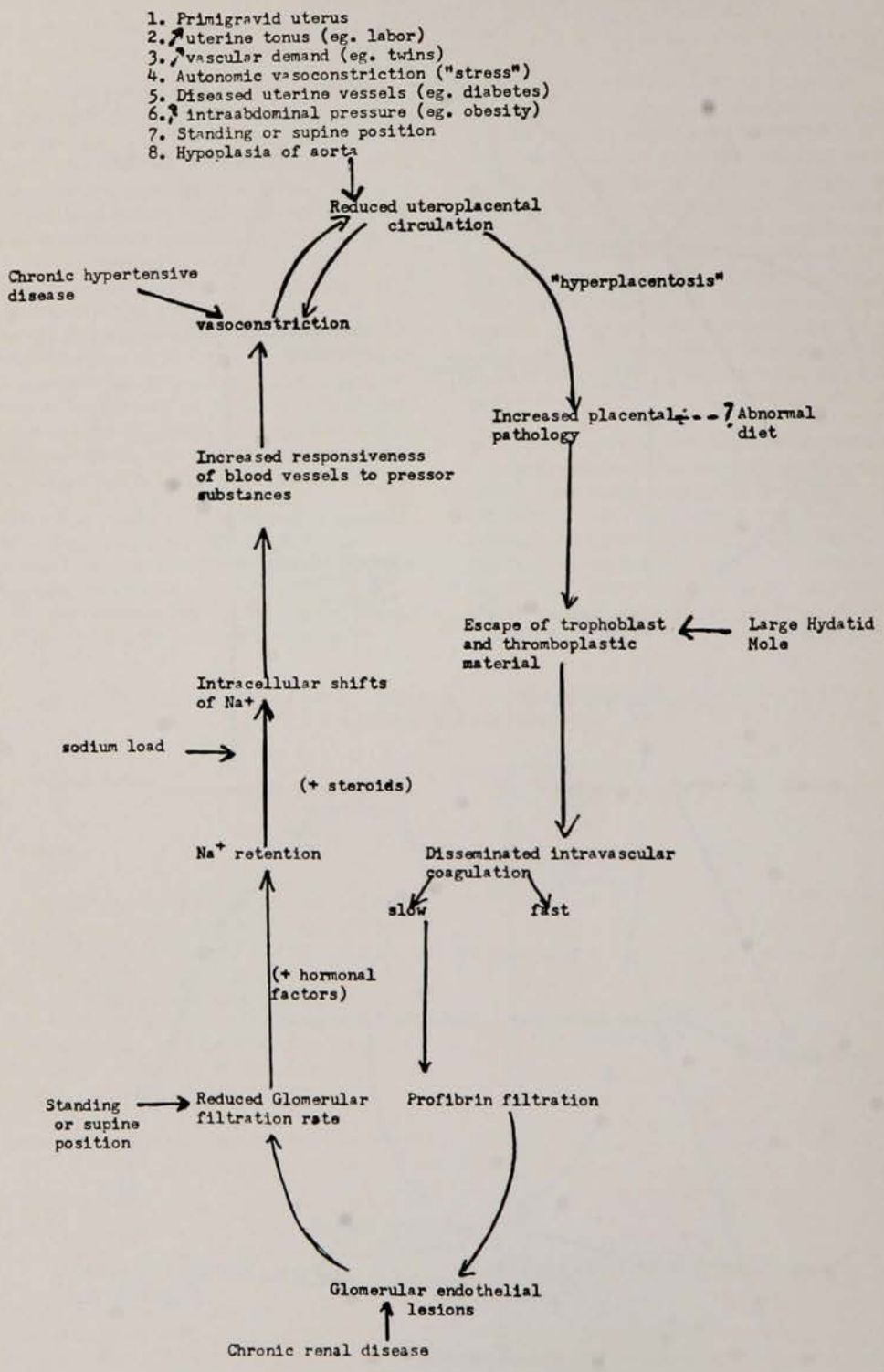


Fig. 3: Consequences of the Vicious Circle in the Pathogenesis of Hypertensive Disorders of Pregnancy



—Adapted from E. W. Page "On the pathogenesis of pre-eclampsia and eclampsia." J. Obst. and Gynec. Brit. Common, 1972, Vol. 27 : 395.

Fig. 4: Vicious Circle Represented in Fig. 3



—Adapted from E. W. Page "On the pathogenesis of pre-eclampsia and eclampsia." J. Obst. and Gynec. Brit. Common., 1972.

of this essay are illustrated. Most of these involve fairly straight-forward physiological mechanisms.

At the start, it was made clear that any concept of the etiology of the hypertensive disorders of pregnancy must account for certain factors. Figure 4 illustrates the outer circle of predisposing factors, including much of the necessary criteria as well as additional possible theories advanced by various people. As far as the criteria are concerned, with chronic hypertensive disease, there is already a generalized vaso-constriction. Chronic renal disease may render the glomeruli more susceptible to endothelial lesions. A reduced uterine blood flow may occur more readily in primigraviadas because of the less extensive vascular apparatus. Uterine ischemia would be favored by the vascular lesions of diabetes mellitus, by uterine distention with twins, by increased intraabdominal pressure with obesity, or by increased uterine contractions as with approaching term. Hydatid moles are associated with an increase transport of trophoblastic material to the lungs. The nutrition theory may have a role in increasing the placental pathology. Thus much of what is known of the hypertensive disorders may be accounted for by this concept.

The hypertensive disorders of pregnancy represent one of the most researched fields of obstetrics. If the reader cares to take the time, he will find that the word "possible" has been used approximately twenty-one times in the course of this discussion. This summarizes the predominant feeling still pervading this topic: uncertainty. The renin-angiotensin system plays a probable role in the pathogenesis, yet this integrating concept presented is no doubt still debatable in places.

* * *

Time and space, those cruelest masters of all editors, having pushed me to extremis leave me no option but the heinous unorthodoxy of ruthlessly excising a myriad of references and a prodigious bibliography ,which are available on request.—(Ed.)

Consumer Reports: Natural Childbirth — A Layperson's Challenge to the Medical Profession

Karen Jazey

INTRODUCTION

Karen Jazey, as well as being a job counsellor here in London, is also a public relations officer for the London Childbirth Education Association. This group which began in September 1971 has an international affiliation whose motto is "Freedom of Choice Through Knowledge of Alternatives". As a voluntary association these lay people and medical professionals are dedicated to promoting family-centred maternity care in the firm belief that comprehensive education for childbirth is of lasting benefit to the developing family.

WHY IS THERE A NEED FOR CHANGE IN MATERNITY CARE?

Were you aware that while Sweden and the Netherlands vie for first place in the annual comparative infant mortality rates issued by the Statistical Office of the United Nations, that Canada and the U.S. vie for 14th and 15th place. I've heard that this might be because our statistics are more reliable but consider also that the slight variations in the collection of this data do not significantly alter the statistics. Statistical research by Gruenwald indicates that 40-60% of all perinatal deaths occur among full term infants weighing over 5½ pounds. Some of our present practices in obstetrics, almost unique to the United States and Canada, undoubtedly have adversely affected our standing by thwarting the normal physiological process of childbirth and lactation.

Doris and John Haire, co-presidents of the International Childbirth Association have considered how our country practices these eleven routines:

1. Little or no effort is made to minimize the mother's need for analgesia and anesthetic through education for and increased support during childbirth. (It is scientifically acknowledged that fear and apprehension adversely affect uterine motility and blood flow and that

maternal analgesia and anesthesia, regional and general, can increase the need for delivery by forceps and the need for resuscitation of the newborn.)

2. Elective induction is carried out for the sake of convenience although it is acknowledged that drugs used to induce or stimulate labor may increase the probability of fetal distress and make it almost impossible for the mother to cope with the discomfort of the intensified contractions without the aid of analgesia and anesthesia.

3. A family member is prohibited from being with the mother during the stress of labor and delivery. Please note that St. Joseph's Hospital just began allowing fathers in the delivery room in September 1973.

4. The mother is not permitted to labor, deliver and recover in the same bed without being moved from her room—an accepted practice in most of the world.

5. The mother is made to assume a non-physiological (lithotomy/stirrup) position for delivery—a position which inhibits the mother's ability to give birth spontaneously and which increases the need for routine episiotomy. (There is no scientific evidence to indicate that routine episiotomy reduces the need for future vaginal repair or reduces neurological impairment in the child.)

6. Placental transfusion is not allowed to occur due to the early clamping of the umbilical cord. (In most countries placental transfusion, which usually facilitates a rapid expulsion of the placenta without chemical or manual assistance, is considered important in reducing the incidence of postpartum hemorrhage and also the incidence of future anemia in the child.

7. The mother and her baby are separated immediately after birth, whether or not the mother has received medication. (There is no medical evidence to indicate that a baby who is unaffected by maternal medication and is kept dry and warm in his mother's arms while breast-feeding in the delivery room will suffer an abnormal drop in body temperature.)

8. The hospital routine then sharply limits the time the newborn infant spends with his mother and father, the only two people in the world with whom he is bacteriologically compatible.

9. Little or no effort is made to encourage breast-feeding, especially among the poor, despite the irrefutable natural protection against disease, infection and tooth decay that breast-feeding affords the baby.

10. The time of the first breast-feeding is delayed 8-12-24 hours, whether or not the mother (and infant indirectly) has received medication. (There is no medical evidence to support the practice of routinely delaying the time of the first feeding or of giving the infant sugar water prior to being breast-fed. There is ample scientific research to indicate that colostrum benefits the baby by giving him immediate protection against disease and infection.

11. Breast-feeding infants are restricted to a rigid non-physiological feeding schedule although scientific research has shown that the average newborn varies greatly in his nutritional requirements during the first two weeks of life—from 3-6 feedings the first day to 11 feedings on the fifth day, gradually decreasing to 6-9 feedings daily in the second week of life.

What is considered to be the normal use of medication in this country is considered to be excessive use in countries such as Sweden and the Netherlands. The adverse effects of obstetrical medication on the fetus and infant demonstrated by Brazelton, Kron, Niswander, Windle and many others attest to the inherent risks of these well-intentioned medicaments. Also I was fortunate enough to hear Dr. Marshall Klaus speak on his findings which demonstrated that early neonatal separation can interfere with the common behavioural sequences present in women as they establish affectional ties with their infants. Many infants survive the many diversions from physiological childbirth, but there is still much to be considered as to how these diversions may affect the future well-being of the child and the parent-child interactions.

London's Childbirth Association compiled a short questionnaire for use in this article. It was distributed for one week, February 18-22, at Victoria Hospital. Indifference and just plain apathy are sharply illustrated on the part of the patient and their respective medical advisers. Twenty-nine women received the questionnaire. For fourteen of the women it was their first baby, while for fifteen it was not. Nine of these women had attended prenatal classes, while twenty had not. Three had attended prenatal classes for previous pregnancies while twelve had not. Eighteen women were aware that prenatal classes did exist while five were not. Six did not answer. Three said they would have

attended if they had known of the classes while twelve said they would not have attended anyway. Eight of these women were referred to classes by their doctor while twenty-one were not. Five of these women were encouraged by their doctors to have their husbands involved while twenty-four were not. It's hard to avoid facts which hit very close to home.

Our culture has created a generation of women who, on the whole, prefer to submit passively to being delivered of their babies, unaware that their reluctance to participate places their babies at a disadvantage. If we are to effect a change for the better we must begin by helping each mother to appreciate the important contribution which she can make to her child's long term well-being by availing herself of proper prenatal diet. Also the couple should be prepared to cope with the stress and discomfort of childbirth. Childbirth classes should be an inherent part of hospital maternity care if we are to reduce or eliminate the mother's need for medication during labor and birth. I realize that our conventional concept of maternity care was adopted 50 to 60 years ago to thwart illness, difficulty with delivery, mental incompetence or extreme poverty but today 90% of all mothers give birth without complications. I question the need to impose conventional hospital practices on the healthy maternity patient carrying out a normal physiological function. While we cannot change our culture overnight, we must begin somewhere. We in the Childbirth Education Association feel there is no better way than to offer family-centered care to all maternity patients.

Dr. Murray Enkin from St. Joseph's Hospital in Hamilton is I.C.E.A.'s vice-president. Next spring Hamilton will be sponsoring the first Canadian Mid-West Regional Conference for the association. This would be an excellent opportunity to share with lay and medical people a "better approach to obstetrical care". For any further information, please contact Ms. Jazey at 471-0406.

* * *

The following article which has been adapted from the book, *Pregnancy, Birth and the Newborn Baby*, clearly outlines many of our group's aspirations. Perhaps it will express to all of you who are potential medical professionals, what we the lay people in this organization and many out of it, wish to share with you.

In recent years many women have questioned the purely technical approach to labor and delivery. They do not want to "be delivered"—they want to deliver. They resent the passive quality of their role in the process and want their husbands to share in the experience. They regard bearing a child as one of the great milestones, if not the ultimate personal experience, in the development of a mature woman—the culmination of her biological destiny. They reject the attitude that pregnancy is some form of disease. They see the birth of a child as a normal process, and far from wanting the experience blotted out by drugs, they want to live it and exploit it to the full.

Unlike some of the early converts to natural childbirth, today's advocates do not rigidly oppose all medical intervention or reject altogether the use of forceps, analgesics and anesthetics. What they seek is to have these aids placed in a different perspective—they should be available, but used only when absolutely necessary. These modern advocates of natural childbirth believe that for the normal woman having a normal pregnancy, labor and delivery, the emphasis should be on the psychological and emotional preparation for childbirth and parenthood.

Whether one accepts the theory of natural childbirth or the more traditional medicated delivery, it is important for women of childbearing age to know that the choice does exist. Moreover, they should know that they can profit from attending classes for natural childbirth even if in the end they elect (or their doctors advise them) to follow standard medical approaches. The pregnant woman has nothing to lose and everything to gain from having her husband participate directly in the events immediately preceding birth, and she is almost bound to benefit emotionally from the atmosphere in which the classes are held as well as from the instruction itself.

According to the original natural-childbirth concept, each couple in a childbirth education course was encouraged to form a close relationship with one of the nurses or one of the trained lay persons. This nurse, the *monatrice*, or the trained lay person would act as coach for the pregnant wife and see her through labor and delivery at the hospital. But the great popularity of the courses has made this personal attention impossible, and the emphasis now is on teaching the husband to do the same job. He supervises the preparatory exercises and, where permitted, accompanies his wife into the delivery room.

There is nothing staged or artificial about his participation, and this drawing together of husband and wife at a pivotal event in their lives tends to cement their dedication to each other and gives them a stronger approach to parenthood.

As might be expected, in the classes themselves the emphasis and the instructional details vary, but certain themes are fairly standard. Usually the woman and her husband join a class about two months before her expected delivery date. The class meets weekly, and groups are kept small to enable the enrolled couples, as well as the instructors and advisers, to get to know one another.

There is an element of "group therapy" in the procedures. As the couples begin to warm to one another they share their questions and worries about the impending events. Discovering that others have the same concerns and worries and that they are learning to deal with them always tends to reinforce your self-confidence and enables you to face the future with greater equanimity. "Graduates" of the course who recently have given birth return to describe their experiences and answer questions. Often hospital visits are arranged to acquaint the group with some of the practices that they will be encountering there.

Instruction in the physiology of labor and delivery is given with films, tape recordings, video tape, charts, diagrams, still pictures and anatomical models as well as written material. Much attention is paid to the nature and rhythm of the uterine contractions in the various stages of labor. The idea is to educate the pregnant woman to recognize the characteristics of her labor at any point so that she will have an idea of what comes next and how soon.

In the transition stage of labor, for example, just prior to the full dilatation of the cervix, discomfort approaches the maximum. This is the time when the woman might be expected to ask for an anesthetic. But if she has been trained to realize that only a few more contractions will carry her out of this stage and to the beginning of the next—the expulsion of the baby—it is likely she will be able to summon enough resolution to go on to deliver herself.

The mother who has had the training offered in these courses will know immediately what the physician means when she hears him say that the cervix is five centimeters dilated and 80 per cent effaced and will be able to gauge from this information her capacity to continue without getting demoralized and giving up. Mothers are taught when to accept support from the "team"—the doctor, the nurses and other hospital personnel—as they deal with the most intense contractions in transition. Fortunately, transition passes quickly, and the more active pushing of the second stage, leading soon to the delivery of the baby, is a welcome change.

Physical fitness is emphasized in these courses. Peak muscle tone assists the mother in meeting the strenuous demands of labor as it progresses, and in the final stage enables her to bear down strongly without tiring. In order to help the mother conserve her strength and preserve her calmness, the courses also teach techniques of general muscle relaxation.

A more specific element of the training is the "psychoprophylactic" conditioning. The essence of this is to set up a distracting stimulus to take the woman's mind off labor. In the language of behavioral psychology, the mother is "deconditioned" to the pain of uterine contractions by "conditioning" her to another stimulus—in this case, a system of breathing.

In the Lamaze system of natural childbirth, the rate of breathing is regulated according to the intensity and duration of the uterine contractions. In the early stage of labor the mother's inhalations and exhalations are slow and deep. As the frequency and intensity of the contractions increase she switches to shallow, rapid panting. In the final stage another rhythm of breathing helps her to either bear down or relax, thus giving her some measure of control over the speed of the delivery. The husband is taught certain techniques of massage, or *effleurage,* that help his wife to relax during and between contractions.

The attitude toward control of pain in natural-childbirth courses is not heroic but realistic. It is accepted that analgesics, or painkillers, in judiciously small doses, and sometimes paracervical or other local anesthetic may be given. Further it is assumed that general or spinal anesthetic will be used if in the physician's opinion some complication requires it. The mother thus can proceed with a natural childbirth in complete confidence because she knows that the full apparatus of modern obstetrics—anesthetic, surgery, fresh blood—is there for her rescue if some complication should arise. In practice, the majority of mothers in natural childbirth do not require an anesthetic, but each is expected to do what is most comfortable and best for her.

Some obstetricians supplement the formal natural-childbirth courses with review sessions late in pregnancy to tie together all that the couples have learned and bring it into focus with the actual team that will be involved in the delivery. "Awake and aware" mothers and fathers can be an invaluable aid to the confident management of labor and delivery.

Until quite recently the great majority of American women wanted amnesia and an

anesthetized delivery, with the least possible preparation and participation. After all, it was partially in response to this feeling, which represented the best thinking of the times, that modern obstetrics developed along the lines it did. But now times are different and many physicians are showing an interest in the psychoprophylactic and other preparatory techniques of childbirth.

Prepared childbirth has challenged the physician's way of thinking and acting. Instead of "delivering" the baby, he now is asked to be available if needed, a valued supporting player but not the star in the drama of childbirth. More physicians these days will be supportive of and sympathetic to couples who want to give natural childbirth a try, and at the same time they will not push this approach upon their patients.

The trend among the doctors is in line with a somewhat parallel trend in the hospitals. An effort is being made to provide a comfortable atmosphere for natural deliveries and for rooming-in arrangements for the mother and her new baby, as well as relaxed arrangements for the father's visiting. Breast feeding tends to be fostered, is greatly aided by livelier, nonmedicated babies and often may begin on the delivery table minutes after birth.

Whatever your thoughts about natural, or prepared, childbirth, you would do well to remember that most proponents of these approaches have an honest conviction that it is better for the mother and father to know what is happening and to prepare for it together; an equally honest conviction that it is better for the newborn to have had little or no medication; and a very firm and honest conviction that the couple that achieve this kind of experience have accomplished something that will make them better and more understanding persons, better mates and better parents.

The whole phenomenon can be looked upon as a complex social, medical and personal experience that draws upon the accumulated experiences of psychologists, psychiatrists, obstetricians and parents themselves. In the newness of these approaches there is excitement and promise, the process of giving birth assumes a stature that is gratifying to participate in for the parents, the physician and nurse and, in the long run, the child, who is the focal point of it all.

* * *

Book Review

by J. Van Dorp

Anatomy and Physiology for Radiographers. C.K. Warrick. Macmillan of Canada. $8.50 list.

Dr. Warrick has more distinctions and degrees than a thermometer (and that is rather difficult in Scotland). In spite of it, though, he has written a readable text. If to be brief is to be virtuous then as anatomists go, Dr. Warrick is a paragon of virtue. His line diagrams are succinct and the radiographs have been remarkably well reproduced. This is not only an excellent working manual but the cat's meow for 'boning up' to essay anatomy exams.

* * *

Many are the platitudes about old age, but one of my favorite stories about assumptions of infirmity concerns a person whose wit never deserted him—Sir Winston Churchill. Two younger MPs passed Sir Winston as he was being assisted up a flight of stairs in the British House of Commons. "Shame about the old boy getting so senile", said one. "Yes," said the other. "I hear he has to be helped everywhere now." The 'old boy' wheeled sharply and said in piercing tones, "Yes, and they say he's deaf, too!"

—Margaret McCaffery, ed., The Canadian Family Physician, *Dec. 1973*

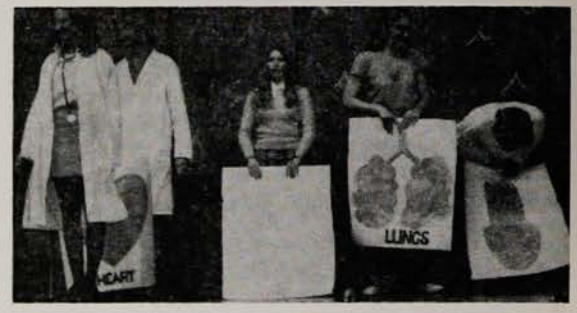
* * *

On one southern French campus a huge red inscription yells: "Mao—Vieux Singe". Five years ago that would have provoked a riot; nowadays there aren't enough Maoists around to scrub it out. The man chiefly responsible for the decline of campus Maoism is President Richard Nixon. You need the faith of a dervish and agility of a Sartre to cope with those photos of God entertaining the Devil in the very heart of the forbidden city.

—The Globe and Mail, Feb. 27, 1974

MED'S 77

THE NEW CURRICULUM



MED'S 76

MED'S 75

MED'S 74

DEFINITELY NOT DIABETIC

WATTERS BLOWS HIS OWN

TURN YOUR HEAD TO THE RIGHT
AND COUGH!

ARE YOU SURE THIS IS HOW YOU
TEST THE GRACILIS?

The Agony and the Ecstasy of Meds '74

Meds '74 came into being early in September 1970, when our motley crew was first assembled, ironically enough, in the Dental Lounge. We were welcomed by an awesome Hippocratic Council President, a real live Dean of Medicine and the infamous (but, as yet, unknown) Brucey Squires. Everyone pinched themselves to make sure it was real—some pinched others.

It is hard to believe that no one fainted during our first anatomy lab, though most were relieved to know that Mike Austin looked so good in green. Soon we were getting to know each other better—everyone recognized Timmy Lynn's guffaw—but, who the hell was Rick Haddad—oh yeah, he was the skinny kid who wanted to quit and go back to Toronto because he wasn't doing well enough!

Tachycardia rolled around (and so, for the most part, did we!) Nigel (Ed Sullivan) and Walter's Ukrainian dancers put on a tremendous performance. Barry Long never looked so good in a bonnet and diapers. Mike's imitation of Dr. Gwyn earned him the critical acclaim of his classmates and a "C" in anatomy. Even J. C. Payne with his "erudite mothers" line couldn't salvage it for us. And, for some strange reason, we came in last that year. Perhaps Peter Johnston, our merry-whatever, had something to do with it (I bet he wishes he had nothing to do with it!).

The Christmas party gave us Steve Johnson as Ronald MacDonald and Rich Minielly as Santa Claus à la Al Capone. Everyone had a grand time belting out Christmas carols and opening presents especially Adele's kid, who got so excited that he wet his pants as well as her lap. The best part of the party was that the exams were over.

Winter weekend brought Meds '74 its only fame—a winning ice sculpture. "Happiness is dragon a piece of tail" is the motto that clinched first prize for us.

The rest of first year was spent cramming millions of assorted, but not altogether useful, facts into our empty little heads. Wonder of wonders—we all made it into second year!

Aw yes—second year. A kaleidoscope of even greater volumes of knowledge and good times. Remember the highlights? Meds '74 donated a giant sperm piggy bank to the Homecoming Parade. Whoever heard of "Insemination for the Nation"? Obviously not the judges! In Tachycardia, our flawless performance in "The Christmas Carol" earned us second place. Second place? Even Sam Fratesi's frantic wheelbarrowing all over the stage couldn't put it "in the bag" for us.

In Pathology our class discovered a new syndrome—The True Steven Johnson Syndrome—when good old Steve slept through 7 out of 8 classes and then asked 5 questions in the last lecture. The triad of symptoms found were: marcolepsy, dysarthria and multiple mounting behaviour. Multiple what? Ask Steve.

At Christmas in second year we got a new classmate—Trevor Biggs (enough said). Richy Haddad earned the name of "Giant Cell King" which has appropriately been shortened to just "king".

The highlight of the year didn't come, however, until we had final exams safely behind us. Who could forget Dr. Smout's yellow happy face socks at the year-end party.

Second year we began to see real (live) patients. Diagnostic clinics were always interesting—we learned to expect the unexpected. Strangely, no patient ever seemed to have a classical history or physical findings. Now Brad Hunkin knows better than to kneel directly in front of a hyperflexic patient when he elicits a knee jerk. Who was it who did a rectal and forgot the glove? Guy De Rose now knows 12 different ways to examine a spleen.

Third year started off well—a party at Barney's farm with its spring-fed swimming pool. We all got sucked into chopping Barney's winter wood supply—pretty clever for a neurologist!

Then we began our love-hate relationship with Frankie Diesel—or was it vice-versa! In therapeutics we not only learned the care and feeding of patients, but we also learned the Queen's English. Will the real frustrated grammar prof please stand up?

Our third year Tachycardia attempt, The Goddoctor, saw the debut of the Chinese mafia, starring Hugo Law and his 6 foot acupuncture needle. Impersonations were the

rage—Frank Deziel, Big Al, Bill Pace and Charlie Drake may never forgive us! Second place was becoming habit-forming!

Clinics rolled merrily along. George Vilos did his first sigmoidoscopy—lucky he didn't tell the patient he was Greek! Suddenly it was the 3rd Year-4th Year Party and then there was nothing to look forward to but the American Boards. The only good thing about them was that they were soon over!

Fourth year at last. "Clinical jerk—help ya?" runs through many a hospital hall. It seemed like just yesterday we were in third year (for some of us—it was yesterday!).

Electives were far-flung—Maggsy-Beth and John Pook in Barbados catching some sun—Adele in New Orleans seeing 3 gun-shot wounds per day—Tom Phillips, John Hayley, Greg Cairncross and George Dundas drinking England into their energy crisis. Peter Bloch, Peter Mac, Millie, Steve Brady and Brian Richardson wrestling bears in B.C. when they wern't saving lives—Mo Thompson in Strathroy (where?).

February 1974 brought the excitement of internships. We're spread from sea to sea—from Fets in Newfie to Campbell in Victoria —Look out Canada!

Another notable event was the infectious disease that spread to eleven (count 'em) of our classmates—that psychotic condition called "engagement". They're working on a cure for it right now in the Collip Lab.

Looking back at Meds School at Western, I'm sure many of us will have fond (and not so fond) memories for years to come. Can you imagine our first 5-year reunion. I can hardly wait.

Su Bright and Peter Johnston

Class News

MEDS '75

As we trundle along the road to fourth year, life is not without its lighter moments. It seemed appropriate in this issue to bring to light some of the more pecu'iar doings of Meds '75.

Along clinical lines, our class is making its share of contributions. A "medical first" is reported by Sharon Macko, who discovered spider nevi *below* the waist of a patient. Not to be out-done, Dr. S. Helliar has drawn attention to a seldom-recognized pathological entity—"Harrison's Sulcus"—a big depression in the chest that is acquired by medical students who read that hefty tome in bed. (I wonder what Steve uses? Coles Notes?) And speaking of pathology, it is truly amazing to contemplate the number of paired, ash-leaf shaped, erythematous lesions that have been appearing of late on the necks of certain young ladies in our class, especially on Monday mornings.

Third year needs lectures in bedside manner. One of our cohorts was examining a neuro case: he stepped out of the room for a minute, and when he returned the patient was comatose. Maybe Scope would help. In fact, perhaps we should all use a mouthwash: it might cut down on the number of students getting thrown out of patients' rooms.

Despite well-known misanthropic predilections, and a passionate dislike of such decadent bourgeois social farces as parties and the like, Mr. Helliar nevertheless managed to put in an appearance at the annual 3rd year/4th year shindig. He was encouraged in this regard by Messrs. Blacklock, Rowe, *et al,* who brought their protesting victim bound and fettered in an old tarpaulin and ropes. Work boots and all.

By the way, an ominous warning was issued at this same gathering. It is rumored that certain stethoscope(s) have been sabotaged by Sinister Forces, to the extent that sound proceeds not from the diaphragm to the hear-holes. The funny thing is, that none of the victim(s) of this prank seemed to have noticed any difference! So much for clinical science.

Meds '75 has long been renowned for academic zeal. Dr. Vigner recently changed the venu of the Family Medicine lectures from the Busby Room to his office, where he said he had two extra chairs. Group K seems to have decided that one student constitutes a quorum for obs/gyne at St. Joes'. Of course, that is a better response than certain surgeons at Westminster have been getting.

FLASH!

Dr. Smout, our venerable honorary president, has disclosed that Tom Downs has suddenly "got religion". He reads the Bible every night—in a different hotel room.

WANTED:

Black and white photographs, with negatives, of people in our class. Copies will be made, originals and negs, returned to owner promptly. Please apply to yours truly.

A FINAL NOTICE:

Anybody who has an eye for one of our charming girls had better get his application in soon. Recently engaged: Kathy McCully (Dr. Galil); Cathy Whiting; Miriam Ridley

(Peter Brown with the dark hair—Meds '75); Mary Humeniuk (Chris Bruckswager—Meds '74). Hurry. They're going fast.

Hang in there, group. And keep on praying, Tom.

Neil McAlister, archivist

MAD NEWS '76

Slack week? Never heard of it! For the hardened veterans of Meds '76 school ended January 28 when 95% of these incumbent healers succumbed to the insidious onslaught of apathy and joined the ranks of the mediocre.

Chiropractors are launching a suit against topless masseuse parlours which they claim are putting them financially on the rack. Charles Q. Armwrecker, Quacker-in-Chief, expressed his disgust at the "gross sensationalism" he feels the 'rub clubs' are using to exploit the public. According to Chuck, the backbone of Canadian Society is at stake and he is not about to turn the other cheek, until he gets to the seat of the problem and the masseurs have been fully exposed for the 'rubby-dubs' that they are. Ms. Androgens, head of the local libbers, spoke up in behalf of the predominantly male chiropractor society. She said the idea of males engaged in such menial tasks was not without appeal for women, provided they didn't rub you the wrong way.

Speaking of appeal, the entire male population of Western University went on streak just recently. Abashed onlookers hardly knew which way to turn (in the interest of propriety). Screams of panic were heard as the boys ran through the campus pursued by herds of curiosity seekers looking for souvenirs to take home to the family. Joe Show, chief streaker for Uron College has claimed that streaking is rapidly becoming passe and that in some areas it was being replaced by creeping which permitted greater audience participation. Joe claims "It's a damn shame some of the lengths you have to go to get a little attenion around here. People don't have any respect for show business talent anymore. You practically have to cartwheel through campus to get some babes to blink an eye." Humphrey Fag, spokesman for U.W.O.'s Homophiles feels that streaking isn't really as decadent as some people might think. "After all," says Hump, "it's really nothing you wouldn't see in any decent showerroom. People wouldn't be quite so upset if they'd only slow the pace down a little and get some of those women out of the way."

Not wanting to be left out of the streaking, Meds '76's feminist libertines, led by Barb Mayr, streaked through the I.C.U. at Victoria Hospital and left hearts failing and nurses wailing. (Barbie's now being sued for the cost of three defibrillators which were burnt out during the escapade, not to mention a number of pacemakers.)

Bill (Poncho) Watt (lightbulb magnate and squash superstar) broke a world record April 31 stuffing 14 hundred-watt lightbulbs into his mouth and still beating his opponent, the grandmaster of the farmers' squash team (to a pulp, I might add). Bill was reprimanded however, by the judges when they discovered that he had cheated by swallowing 7 of the bulbs during the match. Bill is now writing a treatise on "Bulbophagia and the light it sheds on gastric disturbances".

Louise Martin has been elected Marinelands Mermaid of the Month. She's been holding her breath for the Olympic swim meet at Expo in '76 since August and is just beginning to turn aqua blue. Furthermore, during her elective in plastic surgery she's been attempting to graft a set of gills and a propellor underneath her back fins. Good luck Louise!

Skai Stevenson has been peering out from behind a monstrous homemade bread and cheese sandwich in Path lectures recently. Apparently he has been left a cookie house and a mountain of dough due to the untimely demise of his uncle Toastmaster Stevenson and his two children and heirs, Hansel and Gretel Stevenson in a severe bout of ptomaine poisoning that hit his home-town, the Village Grimm, just last month. He has been trying voraciously to dispose of his inheritance ever since.

Julian Oates, show-biz tycoon and master of iniquity, is throwing a beach party this week. In order to entice the beach boys to join the festivities he has had the entire California coast moved into his yard, ¼ of the Pacific Ocean and an oil slick to add to the atmosphere. He is staging earthquakes regularly on the decade.

Western's own galloping gourmet, Monsieur Bruce le Sweek took up French cooking just this month and has had the trots ever since. Le Sweetie's recipe for kosher poulet flambe is well-known among campus epicureans not to mention the S.P.C.A. (who feel that topical cognac leaves much to be desired in the line of anesthesia) and the officials at Firehouse 7 who have been called in upon occasion by seething neighbours (no doubt burning up with jealousy) as a backup group for Brucie's "enlightening" performances. Despite his lack of success in his apartment with the bird under cognac,

Sweetie has done much better with the French tart and peasant under grass not to mention the alley-cat under stress. Bruce, le Doux, is now working on a treat for the whole neighbourhood! an H-bomb salad, and in the event that his plans go up in smoke, so to speak, he is considering a sideline as a pyromaniac—Keep the homefires burning Bruce—you're already halfway there.

And speaking of cooking up a storm, Margie Best gets the Parnelli Jones award for fastest-cook-in-town. Besty does boiled weasel rumps in 7.02 sec. in the quarter (hindquarter) and roast aardvark nostril in 6.72 on nitro but does cold duck in no time at all on straight alcohol. She runs a 1500 cu. in. supercharged pro-comp Westinghouse "flamethrower" with an 8,000 r.p.m. rotisserie apparatus powered by 2,000 sure-grip elastic bands and a 19" biceps.

Robert Kormos has left his former residence and 73-year-old landlady on the grounds of mental cruelty and demands exceeding the propriety of a landlady-tenant relationship. He is now living with the Kormorants in a broadloomed treehouse off the Amazon River in which he plays pinnocle with a wonderboy, a sexy koala bear and a cheetah.

Mr. Globetrotter, J. G. Cooles, spends so much time on the B-Ball courts these days that he's developed a severe case of hydrophobic Parkinsonism and can be seen dribbling ubiquitously at anytime of the day. Not only does John dribble when he walks but he dribbles when he talks and rumour has it that he even dribbles in the can, except when he's scoring. His passes seem to be improving according to his coach M.D., but astute observers have heard cries of foul from the Kresge Building. He has so many callouses he has to do his physicals with his feet. He's planning on 'travelling' in the public relations field, but he has more potential for urology. John has also been known to develop transient cases of severe edema of the right foot especially when driving anything larger than a mazaratti, but his workouts in the courts seem to be keeping him off the roads.

Betsy Hall, part-time publisher of playgirl magazine and party-girl, has invited the boys up to her corporation lodge on Georgian Bay for another weekend of wine, song and philosophy. Betsy admits that in a good year, out of the 50 or so boys that show up, she manages about a dozen fold-outs and about 3 times that many fold-ups. Betsy hates to see any of the boys go away disappointed and so she leaves them a little memento of their encounter with the help of her branding iron. She was soliciting talent in Europe around the turn of the 3rd quarter but with the recent step-up in campus streaking she expects to do most of her work closer to home. Benevolently,

M. McGarragle

MEDS '77

The first year of medicine, as any other class has known it, is now over for the class of '77. In the last few days we have struggled through the exams that officially put an end to all the formal teaching of basic sciences that will ever be given us. But it is only March and there are still three months of school left. What are we to do? Now it's on to the applied sciences of medicine: the pathology, the neurosciences, the clinical science and methods (which began in second quarter) and the bacteriology (which began last trimester) in which our newly acquired knowledge will be applied.

It has been a year of adjustment and change for many. The ability to maintain that ninety average is no longer there and more realistic goals have been set (to maintain an average above sixty) enabling the student to have a fairly good time in medicine, as well as, working hard to learn and understand the important concepts of the various subjects. The students themselves have been changed from unknown numbers amongst thousands to integral parts of a small community. Now, when one says hello, it is with a name (hello Richard Casey) instead of just a quick "hi" because you don't know any names. All of the changes have produced a fairly tightly knit group of people.

In conclusion, on behalf of the class, I would like to thank all of the faculties and their members who contributed to what we have been taught in our first twenty-four weeks. I only hope (since it went so fast) that I remember some of it.

Bob Brown

P.S.: What the hell was the name of that muscle, I knew it last week.

* * *

When people's ill, they comes to me.
I physics, bleeds and sweats 'em;
Sometimes they live, sometimes they die,
What's that to me? I let's 'em.

—Dr. Lettson, 17th. c.

Parcost and Some of Our Experiences Encountered During Visits to Pharmaceutical Manufacturers

The Late J. M. Parker,

Department of Pharmacology, Chairman of Drug Quality and Therapeutics Committee, (Ministry of Health)

When a lead news item in Science, January 25, 1974 reads "Prescription Drugs: Health, Education and Welfare will only pay lowest Price", we should take a look at what has been happening in Ontario since 1968.

A 1968 estimate of the cost of drugs for patients in Ontario paid by either the patient or by government amounted to $200 million annually. An important sum to be concerned about! The experience of the Ontario Ministry of Health with direct purchase of drugs for tuberculosis and mental hospitals was encouraging. By using their own laboratory services and review of company procedures, the Ministry was achieving substantial savings on bids by tender. Quality was assured because of their own laboratory evaluations and then acceptance or rejection. The laboratory and purchase programme began in 1960. Hospitals in many countries had formed pharmacy and therapeutics committees and, with prior agreement from attending staff, were insisting on the use of the brand of a drug which the committee had recommended for purchase. This was working without harm to patients and was keeping down costs.

Why not just pass legislation to have the pharmacist substitute and supply the cheapest drug available? Alberta tried this in 1962. It has been mainly ignored and unsuccessful in affecting drug costs.

The New Hampshire legislature discussed proposing a bill to fine a physician $25.00 if he did not put the generic name on his prescriptions. This aspect was withdrawn from the final draft. Force is not the way to change long-standing habits!

All these proposals neglected *quality*. Only if the physician can be assured of the quality, the reliability, the consistency of quantity, etc. of a drug should he use that drug.

The experiences of the Ministry with their own purchasing programme was more than sufficient to alert them to the fact that not all drugs on the Canadian market in 1968 were of top quality. In 1960 25% were rejected as unsuitable. In 1968, this was 10%.

How to examine this elusive property of quality? The Drug Quality and Therapeutics Committee was formed with representatives from Ottawa, Kingston, Hamilton, London and Toronto. Members had varied backgrounds: Pharmacy, former pharmaceutical industry experience, internal medicine, pediatrics and pharmacology, with the Professor of Therapeutics from Toronto as our first Chairman. The Ministry provided expertise from their laboratory and Drug Directorate staff, in particular, Dr. Allan Dyer —Director of Drugs and Therapeutics who has had wide industrial, academic and government experience. Meetings were held with the Canadian Pharmaceutical Manufacturers Association and the Canadian Drug Manufacturers. The Federal Food and Drug Directorate was informed and co-operation given by their inspection branch. The help of all these bodies in the growth of our programme is appreciated.

We decided to produce a list of those drugs which made up the most dollars involved in the Ontario drug bill. This list would then be expanded as we gained time in our review of quality. Quality was to be the criteria for inclusion in the index. How was this determined? As the committee gained experience, the most essential components were company visits, manufacturing document reviews, past experience and product evaluation by the Ministry drug testing laboratory. Our visits took a very simple form —a talk with the company president about his organization and policies—how they would handle a recall if an error were made, etc. Then a plant tour—starting with the receiving of raw materials. How these were quarantined until the quality was checked against standards. Then their system of identification of that particular shipment during its future use. Where it was kept in chemical stores, how it was ordered for a production run, who double checked the calculations and weighing of amounts

of ingredients. Then we followed products through the various stages of manufacture. The frequent checks we expected Quality Control to do to ensure that the next step was not undertaken if all was not right, such as uniform mixing of ingredients. A good manufacturer keeps scrupulous control of his labels so there can be no mixups and goods are not released for final packaging until Quality Control is satisfied that the quantities are accurate, etc. We asked to see all these procedures. The most difficult property to evaluate was integrity of the personnel.

What were some of our experiences? We visited some manufacturers with standards and procedures so organized that we wished all manufacturers could visit and imitate. We also visited purchasers of manufactured goods who searched frantically through their files for certificates of quality control or who complained that the custom manufacturers refused to give them any information. Some could not tell us even the date of manufacture of stocks in their warehouse. (In one case a clothes closet.)

When we asked another about clinically testing a product, a letter was produced from Europe saying a trial had been done. "But on your material manufactured here?" we asked. Finally an admitted "No", with the defense that the raw ingredient was purported to be the same, although there was no information that any of that material had come to Canada and certainly the trial was not done with this company's capsules.

One plant had a fine Quality Control lab but on looking through the records raw materials consistently failed USP or BP standards for such simple tests as melting point values. What happened? The new materials were used anyway—the plant manager took little notice of "rejection" by Quality Control. We were not surprised to learn later that here the head of Quality Control, a capable chemist, had quit.

A brief description of the pharmaceutical industry in Canada will show the variation in plants and facilities. Most of the industry is foreign-owned—American, Swiss, German, French or British, but there are many small Canadian Companies and a third group of custom manufacturers owned by various organizations. The latter manufacture tablets, capsules or liquid preparations for other companies. The policy of the Federal Government has been that the person putting his label on the preparation is called the "manufacturer" and this has led to some problems in our inspections. Helpfully, some custom manufacturers were frank enough to tell us that if his customer was willing to pay, he would get quality control services, but if not—that was his problem.

Many of the large companies have excellent facilities and manufacturing policies but it is impossible to generalize. In contrast, a world-wide multinationalcompany may be operating only a small warehouse in Canada with drugs that have been made in Country A—quality control presumably tested in (finished and formed in) Country B and then shipped to Canada. This would be acceptable if the documents were in agreement but when we found all too often that the lot numbers on the material for sale in Canada did not agree with the documents pertaining to its manufacture in A or checked in B. We decided we needed our own rules. One of our first was that raw materials be tested before being used in production and that final products be checked in Canada by a qualified laboratory responsible only to officials of the Canadian operation and government bodies.

Various forms of imperialism upset us—another company (foreign based) did not know at their Canadian office that the formulation of the drug they were selling had been changed by the custom manufacturers whom they relied upon. We then began insisting that anyone who called himself the manufacturer keep on hand in Canada all manufacturing details. We insisted and persuaded the seller to have on his premises and within his knowledge and responsibility all the details of his product. All the ingredients! There were objections but what can be the answer to the question? If a question arises about active ingredients, fillers, incipients, dispersing agents, because some patient has had an allergic reaction, or untoward side effect, it is the responsibility of the company whose name is on the label to have all the information on hand.

In one plant, which has since gone bankrupt, we saw rows and rows of Chlorpromazine syrup with precipitate in the bottom, rejected by the Ontario Ministry of Health. Most companies throw out such a problem; this group was attempting to try to add something to reduce this fault. With such potent drugs the days of "shake well" for a uniform dose are over.

As we walked through some plants we were surprised to see how exceptionally uniform the weights of capsules seemed to be as plotted on the check charts. Samples are taken while the capsulating machine is running, weighed and plotted on a graph. A straight line made us suspect that this procedure was only a gesture, particularly when the operator couldn't repeat it but got a variation from capsule to capsule when we asked him to "show us how you weigh them". The importance of this is that good manufacturing practice states a limit for

overweight and underweight and if this is exceeded, something is wrong, and the process should be stopped and examined. Such "gestures" of compliance worried us about the overall integrity of a company.

One faulty procedure which upset us very much was in a company that checked the first capsules or tablets of a run for potency, etc. and then signed release forms for final packaging or labelling for a manufacturing period which might go on for 2 or 3 days. That is the tail end of the batch was not checked at all! It is not hard to understand how this company had sold penicillin tablets which contained *no* penicillin in part of a lot.

Everyone has heard about bioavailability—there is no use even worrying about bioavailability unless a manufacturer can process his raw materials and active ingredients in such a way as to make a uniform product free of too much or too little of any ingredient.

Early in our programme we realized that we would improve quality. We excluded many firms from our Index. We were not sure we would affect costs. Our only force was the choice of doing business with Ontario. We had no legal powers to deal with what we considered faults.

It is worthwhile noting that none of the manufacturers of digoxin ordered to stop selling by the Federal Health Protection branch recently had been approved for inclusion in Parcost. This decision was reached in advance of the very fine bioavailability studies done by Ottawa. We realized from our visits and document reviews that these companies' basic manufacturing and control methods for digoxin were not up to our standards.

Finally after nearly two years of review and evaluation, our first Index appeared in October 1970. It did not cause much of a stir among the medical profession although pharmacists began to use it.

Successive editions appeared at six month intervals. By 1972 we felt that we had sufficient experience to take a further step. *Product selection*—such as many hospitals do internally. We felt confident about quality and many companies had made improvements as the result of our visits, checking and testing.

There are several classes of drugs where individual variation and maintenance of a therapeutic range is critical. Digitalis preparations and anticoagulants are examples where small overdoses can be toxic. A firm decision was made not to consider substitution for such classes. Other drugs such as the oral contraceptives might broadly be considered as equivalent but we all know the importance of differing amounts of estrogens and progesterones in achieving an ovulatory cycle that closely resembles a normal one with minimal complications. Also the patients' confidence in the package form, color and other details should not be disturbed by an unexpected change. Naturally, these were again not for product selection.

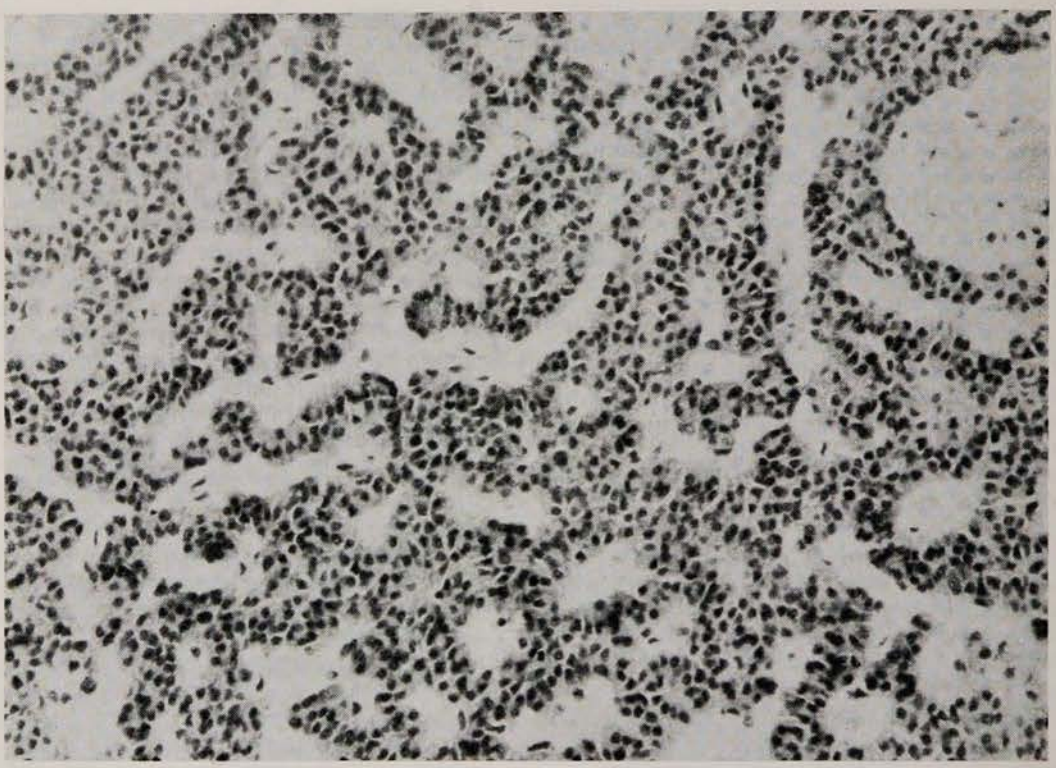
However, tetracycline was a drug where we found nine manufacturers were making excellent products. Our next Index showed these as interchangeable. The legislation allowing this was Bill 144, an amendment to the Pharmacy Act. When this bill was introduced the government promised to review the effects within one year. A committee chaired by the former director of Connaught Medical Research Laboratories, J. K. W. Ferguson, brought in their report to the Ontario Council of Health in March 1973.

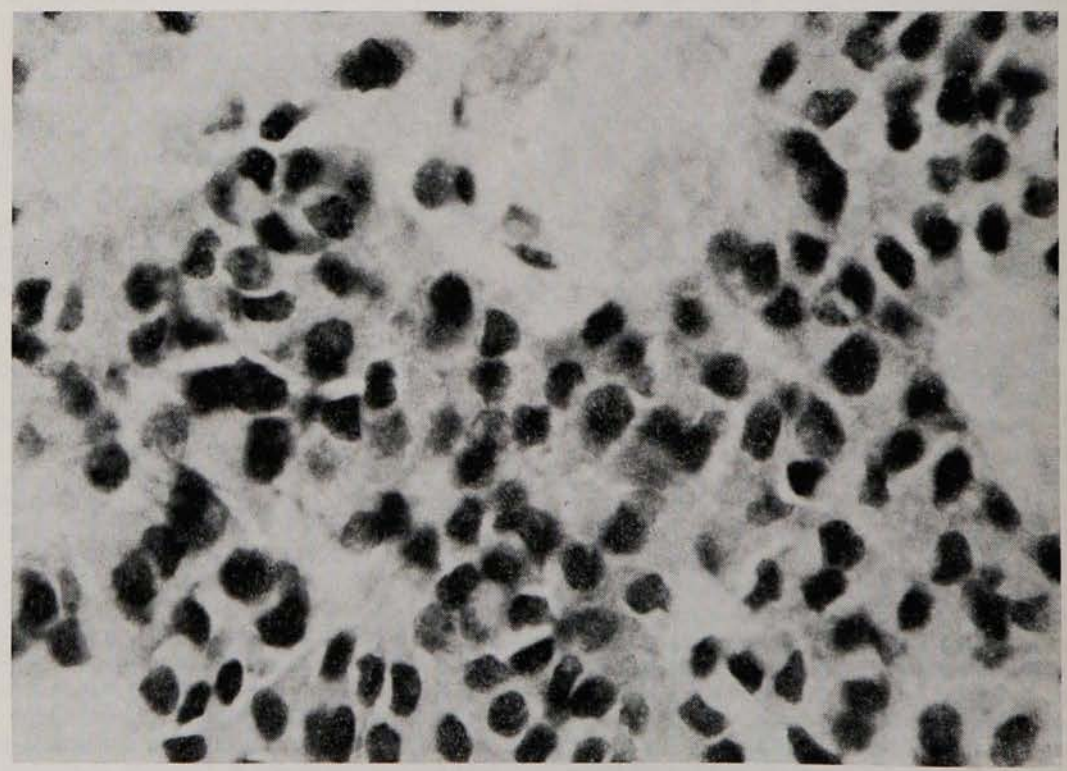
> ". . . it was evident that a majority (57%) of the prescriptions eligible for selection had been written by the prescriber with the intention of reducing the cost to the purchaser and thereby expressing confidence in the list of interchangeable drugs in the CDI."
>
> "The expenditures in 1972 for the Drugs and Therapeutics Branch of the Ministry of Health totalled $839,000.00 which included the administrative and laboratory costs involved in the operation of not only the Parcost Programme and the Drug Quality and Therapeutics Committee, but also the Extended Care Drug Programme and the Provincial Institution Drug Purchasing Program. Inasmuch as the Parcost Programme itself can reasonably claim to have contributed significantly to saving the public of Ontario more than $5,000,000.00 in 1972, the Task Force finds that the Drugs and Therapeutics operation and the Parcost Programme have justified their cost."

So we are making progress. Costs have been affected favourably but more important, quality has improved as noted by the above report. The most important service rendered by the Programme has been to enable physicians and those pharmacists who have adhered to the standards of the Parcost Programme to provide the public with products of excellent quality. This is a service which has become particularly necessary since the suppliers of many important prescription drugs have become so numerous in recent years that one suspects that some are not reliable, a suspicion which has been confirmed by the inspections and tests of the Ministry of Health.

What are our continuing problems? Foremost is to get our story to the physicians and medical students of Ontario.

Pathological Photoquiz





This 42-year-old female patient was admitted to hospital because of a palpable nodule that was situated in the right anterior side of the neck. It was estimated to be about 2 x 3 cms. in size. The patient was otherwise relatively asymptomatic and physical examination revealed no other significant positive findings. All clinical biochemical analyses were normal except for an elevated serum alkaline phosphatase. An upper GI series, a barium enema and an intravenous pyelogram were all negative. A radioactive iodine scan of the thyroid revealed the nodule and showed it to be "cold". Subsequent surgery revealed that the nodule was situated partially within the right lobe of the thyroid gland and so it was excised along with a "cuff" of adjacent thyroid tissue. It was surgically suspected that the lesion might be malignant and so a frozen section was requested. The surgical specimen consisted of an egg-shaped nodule measuring 3.2 x 2.2 x 2.2 cms. It had a thin but clear and distinct capsule and was surrounded by a narrow rim of normal appearing thyroid tissue. The nodule showed very extensive and recent interstitial haemorrhage that was dark red in colour. No cystic degeneration was evident. The remaining tissue of the nodule appeared as a few orange-brown islets of rather soft tissue. The photomicrographs show the surgical specimen. What is your diagnosis?

The answer is on page 117.

Dealing with the Provincial Government: How to Succeed by Really Trying

Sharon Warren

Health care is rapidly being "socialized" in Ontario and, more than it may care to, the medical profession must negotiate its terms of work with the Province. To be successful in negotiations the entire membership, not just its leaders, must be well informed of the issues and their implications. Regardless of who now bears the responsibility for keeping physicians informed, many fail to understand current issues and the potential impact of alternative solutions. This article suggests how the profession might gain more clout in government negotiations through effective internal communications, from the leadership to its lowest ranks.

THE PROFESSION LACKS KNOWLEDGE

Since October a series of three articles aimed at informing the medical students of current health care delivery issues and their implications have been published in this journal. The articles dealt with Medicare, regionalization and the community health centre concept. The editor solicited them, believing that his fellow students were not aware of what was "going on" in Ontario. While no studies have been conducted in Canada to determine how much medical students generally know of government policy and its probable effects on practice, American studies support the editor's suspicion that medical students—the base of the profession's totem pole—are grossly uninformed. For example, a 1966 study of Medicare and medical students at four midwestern schools found that 80% had little or no knowledge regarding the details of the programme.[1] A 1968 study in Iowa which covered a wider variety of issues turned up the same result.[2] This would not be surprising, since few medical schools in either country stress curriculum content which aims at systematically addressing the multiple social, economic and political processes and problems involved in organizing health care delivery. What is included the medical students frequently reject as unimportant in comparison with other subjects.

No parallel studies have apparently been conducted on practising physicians so that it is not known how well they are informed. A review of the literature in professional journals, however, tends to indicate that government policy and its implications are not frequent topics. In an informal poll, London doctors will generally admit to knowing little about such issues. Although they also express an interest in knowing more, the tendency is to place any onus for informing them on the government rather than on themselves as individuals or on the profession's leaders.

WHO SHOULD BE RESPONSIBLE FOR INFORMING DOCTORS?

The government is evidently not willing to assume this responsibility. And why should it? Presumably the government perceives its policies to be in the public's best interests (or in the best interests of being re-elected) and is anxious to have them passed with as little real opposition as possible. An uninformed medical profession benefits this end.

Frequently caught off guard just when legislation is about to be passed, the physician body has little time to consider its implications and form a line of defense if desirable. As the studies of medical students previously quoted show, a typical reaction in this situation is to adopt the negative opinion and argue loudly. To address any policy and win points, however, a knowledge of the kind and magnitude of problems involved is necessary. Physicians, without such knowledge, arguing their position at best look foolish or at worst selfish, since arguments against the proposal will have to be based largely on experience in their "own little worlds". Thus the professional group's power to bargain with the government is diminished, if for no other reason than that it can hardly find much sympathy with a public who has probably already been wooed by well organized and specifically appealing government arguments.

Meanwhile where have the profession's leaders been? While these people are no doubt knowledgeable, their power to negotiate successfully with the government is endangered by the ignorance of the profession's lower ranks. First, the government knows that the professional body is not well informed on specific issues, therefore probably disorganized and possibly apathetic because of their own confusion and the difficulty any individual would have in straightening himself up—let alone his immediate colleagues. Consequently it assumes that most threats of strike, strict reductions of service, etc. which the group's leaders might put forward can be ignored; the interns and residents recent fiasco bears partial witness to this type of situation, although more than their lack of organization ruined the group in its employer's eyes.

Especially if precedents rather than key issues are at stake, it may be virtually impossible for the profession's leaders to mobilize its members effectively. Even the leaders themselves know that mobilization would preferably take the form of subtle resistance. Tactics such as mass petition protests and wide publicity for rational counterarguments take time, but do not bristle the people's backs like strikes or restrictions on service. This type of fight has been waged very successfully by the American Medical Association, for example, in its attempts to forestall general Medicare.[3]

Leadership efforts on their own to win public sympathy are usually defeated when the government can claim that this section of the profession is ultraconservative and does not really represent its own members. Easy to do even though the claim may be false, since the profession's leaders neither inform members adequately nor make many efforts to statistically measure their attitudes towards various issues.

THE PROFESSIONAL LEADERSHIP'S RESPONSIBILITY

Suggesting how B.C. doctors might gain more leverage in bargaining with that province's government, Horniman notes referendum as one of the keynotes to success.[4] A referendum would essentially involve the leadership in informing its physician body succinctly of pending legislation and probable impact on medical practice. It might also recommend a backup method of "persuading" the government to make changes if desirable. Following such information, the profession would be asked to state its preferences as to how the details of this legislation should be shaped or whether it should be opposed, including support for the backup method. The leadership would later also provide physicians with feedback as to where they stand in relation to the majority and what policy has been arrived at on the basis of collected opinions. This approach would undoubtedly provide the leadership with considerable clout by forcing the government to realize and admit, even publicly, that it is not dealing with isolated doctor negotiators but an organized profession.

Besides increasing leverage with the government itself, this approach would probably win public sympathy. In our society, people naturally expect any group to defend or advance its position. With a necessary service like medicine, however, passive tactics are more readily approved. Also there may be some very persuasive and "unselfish" counterarguments which the profession's leaders, backed by its members, can put forward against any attempt by the government to limit them in some professional way. Referendum informs the body of these and allows each physician to present a favourable side of his nature to whatever small public he may be able to influence directly. If passive tactics fail, at least the professional body will be organized and can move easily into a more threatening pose in an effort to force its wishes on the government.

THE REAL KEY TO SUCCESS IN GOVERNMENT DEALINGS

Doctors throughout the world have been, and still are, notorious for sitting back and ignoring problems of health care delivery until their respective governments decide to step in. In many cases, the profession does not even react until a key issue is at stake having let small but cumulative precedents back them into a corner. By then it may be too late to really bargain with the government at all; in essence, the battle has been lost before physicians have begun to fight.

It would not harm the Ontario leadership to try predicting some of the problems of the future or pinpointing those already here, but not yet considered crucial by government officials. Rather than waiting for the Province to act, in a possibly unfavourable way, the profession could formulate policy of its own aimed at correcting the problems. An example was suggested in the most recent article of this series: whereby College restrictions on group practices being transformed more nearly into community health centre projects might be removed before the government takes over their sponsorship itself. Or rather than moving on its own, the profession might suggest middle-of-the-road acceptable approaches for the government to consider. It is likely that the government would welcome any feasible way of avoiding a possibly messy future confrontation. The Canadian Pediatric Society has been experimenting with this method of controlling government measures directly related to it for some time and is proud of its accomplishments.[5]

Referendum could be adapted to help in formulating policy as well as gathering reaction to already proposed government plans. The results may be worth the effort. Not only the profession may gain, but also the public, from better thought out proposals and counterproposals negotiated in a less heated atmosphere.

FOOTNOTES

1. Scholoton, J., *et al*, "Medicare and Medical Students", *JAMA*, Aug. 1966, 333-8.
2. Graham, H., "Medical Students' Knowledge of Medical Care Organization and Delivery: An Exploratory Study", *AJPH*, Feb. 1972, 205-7.
3. Harris, R., *A Sacred Trust* (New York: The New American Library), 1966. The author by no means suggests that some of the more offensive AMA tactics described by Harris should be adopted in Ontario. As a reference, the book merely points out that certain passive tactics can be used effectively.
4. Horniman, E., "Medicollective Bargaining Equals Leverage", *Can. Doc.*, Jan. 1974, 45-9.
5. "How pediatricians deal with government", *Medical Post*, Aug. 8, 1972, p. 11.

Answer to Pathological Photoquiz

Sections of the surgical specimen show the nodule to be an adenoma of the upper parathyroid gland. It was well encapsulated and the narrow rim of adjacent thyroid tissue showed no definite pathological change. There was also a narrow rim of histologically normal parathyroid tissue with abundant adipose tissue situated outside the capsule in one area and adjacent to it. As shown in the first photomicrograph, the adenoma consists of broad contiguous bands and solid islands of chief cells. The supporting stroma is well vascularized. No real acini are being formed. These chief cells in an adenoma are larger than normal and they have very indistinct cell borders. The second photomicrograph is taken at a higher power and shows that their nuclei are enlarged and occupy about half of the cell. They also show a marked variation in size and are hyperchromatic. Mitoses however are not found and there is no invasion of the capsule. The cytoplasm of occasional cells are partially vacuolated. More active parathyroid cells of the water-clear type ("wasserhelle") are very rare and are not clearly seen in these photos. Extensive interstitial haemorrhage into the adenoma with degeneration and necrosis of the tissue is very widespread, but is not shown in the photos. It may have produced the rather large size of the encapsulated nodule that caused it to be clinically palpable. The findings are pathognomonic of a parathyroid adenoma and do not resemble the patterns found in either primary or secondary hyperplasia of the glands. Also, in spite of the rather marked cellular atypism, the lesion shows no evidence of a malignant change. It is felt that the only findings that support a diagnosis of carcinoma of the parathyroid is the presence of mitoses and invasion of the capsule or actual metastases. Regarding the clinical findings in this case, the lesion was found because it was clinically palpable. This is generally uncommon in adenomas. The serum calcium level was normal (phosphorous not estimated) but the alkaline phosphatase was elevated. There was no radiological evidence of renal lithiasis, nephrocalcinosis or localized bone lesions. The urinary calcium output was not estimated. An adenoma is by far the most common cause of primary hyperparathyroidism but the latter was not yet clinically apparent in this patient. Post-operatively the patient did well and she is being followed clinically.

F. N. Lewis, M.D., F.R.C.P.(C)

REFERENCE:
Kay, S. and Hume, D.M.: Carcinoma of the Parathyroid Gland. Arch. Pathol., *96*: 316-319, 1973.

This is the Research That Was

R. L. Noble

Dr. Noble spent many years here working in the laboratory of the late Dr. J. B. Collip. He returned from his present niche at the Cancer Research Centre, UBC, to deliver the following Convocation Address, October 26.

This University holds a historic spot in the history of medical research; one might commence with Sir Frederick Banting, a surgeon with an empty waiting room. In his spare time, he developed the idea that it might be possible to tie off the pancreatic duct and so alter the pancreas to obtain the mysterious hormone which we now know as Insulin. As you are well aware, this original idea led to the understanding of the disease diabetes, and also allowed Dr. Collip to prepare active extracts of the gland which he was able to purify adequately so that they could be administered safely to patients, and provide an effective treatment for this formerly fatal disease. Although the connection of the pancreas in diabetes had been previously established it was not until Dr. Banting's new idea opened the door that real progress was made. It is of interest that Dr. Collip had previously worked in the University of Alberta in Edmonton and had developed new extraction procedures in connection with another hormone from the parathyroid glands, and with this background he was able to apply his methods very quickly to the extraction of insulin. The point which I would like to stress is that these scientists had the time and opportunity to think and work out original concepts. New discoveries in research are not predictable and it is of the utmost importance that the environment should be suitable for any scientists who may be gifted enough and capable of doing creative thinking.

There are many examples where the original concept has developed during work on entirely different projects. As many of you know, Dr. Murray Barr, in the department of anatomy here, was interested in the subject of fatigue in the nervous system and was studying nerve cells under the microscope after electrical stimulation. He noticed a curious dark staining small body near the nucleus in certain nerve cells. In attempting to explain the meaning of this new observation he noted that this body occurred only in the tissues of females.

Even before he had done much comparative work on animals he asked Dr. Linell, a Toronto pathologist, to set aside some human nervous tissue from both males and females, adding that he would go to Toronto in a few days to look at them. There were some twenty-five slides, numbered but unnamed. Using that nuclear marker, Dr. Barr divided them into two groups, male and female. On checking the records Dr. Linell was astounded to find the separation correct in all instances.

This was the discovery of the sex chromatin, a now legally indisputable way to correctly determine the sex of an individual, and an observation which has allowed new areas of research to develop, all over the world both in patient diagnosis and treatment. To this may be added the contributions of Dr. Rossiter's department of biochemistry, and of Dr. Engel and Dr. Carroll's studies in the Collip laboratory, and others which should be included. The experience of Drs. Beer, Cutts and myself in the discovery of Vinblastine was unorthodox. We were working and supported in Dr. Collip's laboratory, totally free from any pressure to pursue the development of any fixed ideas. We were able to make original observations which I am sure must at times have made even Dr. Collip wonder if his liberal ideas in the pursuit of research were not too generous. The activities of a plant Periwinkle (Vinca rosea) in the supposed treatment of diabetes in Jamaica had been brought to our attention, and it was logical that work should be done in the lab with the blessing of Dr. Collip who had had so much to do with the development of insulin. Originally we did experiments with a tea made from the leaves of this plant, which we gave to animals with diabetes, and I am sure that with the number of different brews we made from the leaves Dr. Collip must have thought we were in competition with Sir Thomas Lipton. It turned out, however, that the extracts did nothing for diabetes but affected the white blood cells from the bone marrow of rats. This suggested a possible beneficial effect on leukemia, a form of cancer of blood cells. When the pure substance, VLB, was eventually isolated from the plant by Dr. Beer it was sent to Dr. Harold Warwick, then at the Princess Margaret Hospital, Toronto, who agreed to treat a few patients. Some of these eventually responded with such beneficial effect that

I think we were all a little surprised. I remember his long distance phone call about his first patients as the secretary said "a Dr. Warwick from Toronto wants to speak to you—he must be Italian because all he can say is Eureka." Treatment by Vinca alkaloids was eventually accepted and developed into one now used extensively in many countries for the treatment of certain forms of cancer. It is quite obvious that the outcome of our research was quite unpredictable, and I am sure that had we suggested to the National Cancer Institute that they support work on a tea which might prove of value in the treatment of diabetes, our application would not have been received with great enthusiam. Yet, from this start it was possible to develop a useful drug for the treatment of cancer.

It seems to me likely that the Canadian scientist, perhaps due to his environment or to the type of training he receives has a special forte and tends to be a creator of original ideas. I have quoted names from this university, with which I am more familiar, but one may go across Canada and list many original concepts which have been developed by Canadian scientists. From the West coast, Dr. Harold Copp's recent discovery of a new hormone from the parathyroid gland which controls calcium in the body,—Dr. Harold Johnns' development of the cobalt

bomb in Saskatoon—Dr. Chown's group in Winnipeg and their new findings concerning the Rh blood factor so important to many mothers and their offspring,—Drs. Parker and Morgan's work in Toronto on tissue culture formulas, which was successfully applied to the production of polio vaccine, and contributions from Dr. Charles Best and his Institute and the Princess Margaret Hospital in Toronto,—Dr. Charles Leblond at McGill developed delicate histological techniques allowing new areas of cell function to be studied, and recently the work of Drs. Freedman and Gold at the same University who have developed a blood test for certain types of cancer. At the University of Montreal one would include studies of the vaccine BCG which has been used for many decades for studies on tuberculosis, but was shown by Drs. Lemonde and Frappier to have some beneficial effects when used to treat animals with tumours. This latter observation has very recently been developed and expanded by clinicians to the extent that there is now a special committee of the Medical Research Council and the National Cancer Institute to investigate the potential use of this substance in the treatment of some forms of cancer. Dr. Seyle's original concepts of the cause and control of stress are also well-known. I am sure that many of you in other faculties could add to the list of names, and one immediately thinks of Dr. Herzberg, of the National Research Council, who was a recent recipient of the Nobel prize.

You may wonder why I have reiterated this list of Canadian discoveries which I am sure are familiar to many of you. The answer is simple. Many scientists and I have become increasingly concerned that the environment for this type of research is changing rapidly and is no longer suitable for original and creative research. Why do I think the type of research has changed from what it was to what it is now? Why am I concerned that the present environment is different from what it was in the past? The reasons for this gradual change are subtle and not easy to define. However, I think that they probably arise from the simple fact that there is insufficient research money available in Canada to support all research which is considered to be worthy of receiving it. The application to and eventual receipt of support for research from the various fund granting bodies has now become highly competitive for the money which is available, and a great deal of gamesmanship is required to prepare a successful application. The art of application writing requires such skill that a number of institutions actually give lectures to their applicants on how to prepare a research application in the most attractive manner. The use of a routine stereotyped format has crept into science, unfortunately, as well as into many of our other ways of life. This certainly does not encourage originality. One of the major problems today is how to support a scientist who has original, creative ideas and is not adept, well versed or even interested in the usual conformities in making successful applications for research funds.

It is possible that some of you may not realize just how difficult it is to obtain research funds from granting bodies which possibly have half the amount available for the applications which they receive. Applications are submitted at competitions where they are collected and judged by a scientist's peers. The definition of a scientist's peer is a colleague who was formerly a respected friend. To be a peer is a very unenviable job. On my first visit to the Medical Research Council in Ottawa to act in such a capacity I was very impressed by the landscape which includes an eight foot silver ball mounted outside the building. I did not appreciate its significance until I joined the other peers after lunch to sit gazing into this beautiful silver ball in order to make our decisions regarding whose research should be supported. To be successful an applicant has to define exactly what he wants to do or discover, how he is going to do it and with what facilities and help he may have in the project. It is only with such a tabulation that it is possible to compare one application with another. This may be ideal from the administrative point of view or for selecting the most desirable developmental types of research, but it does not give much hope for an application from an individual who, if he is original, obviously does not know what he is going to discover, or for that matter how he is going to work towards it. I would like to quote Dr. G. Herzberg, director of the National Research Council Division of Pure Physics, and as I mentioned previously, a recent recipient of the Nobel prize, from his convocation speech at York University in 1969—"The thinking behind many of the discussions on scientific policy, particularly when it refers to science rather than technology, completely overlooks the way in which a creative scientist works. A scientific idea originates on rare occasions in the mind of an individual scientist after he has struggled with the subject of his studies for many years. It cannot be foreseen by a committee or a scientific administrator. In order to do his best original work a creative scientist needs freedom from specific directives and this applies irrespective of whether he works on fundamental principles or on applied problems". It would seem questionable, therefore, if the present method is the best

way to support those who may have original concepts in research.

How can one accurately select and support individuals in research who may have original ideas? Historically, in medicine, original contributions have come from all facets of interest and in many cases have not been appreciated even after they have been first described, although they have led eventually to tremendously important applications in medicine. Sir Charles Dodds, under whom it was my privilege to do postgraduate training, had the concept that the hormones, or chemical messengers in the body, were not highly specific types of substances but might be duplicated by a variety of synthetic chemicals. Despite much criticism, he pursued this idea, which ultimately led to the development of stilbestrol and many other synthetic chemicals which mimic the action of the female sex hormones. The outcome of this discovery led to the use of synthetic estrogens in the contraceptive pill. Drs. Minot and Murphy made the rather amazing observation, from the result of their deliberations, that if a person with the fatal disease pernicious anemia were to eat a half-pound or so of raw liver a day their anemia and serious complications disappeared. When this observation was announced it was used as a humorous after-dinner medical story about Americans who were eating pounds of raw liver to treat pernicious anemia; but their observation has stood the test of time and we now know that a vitamin in the liver is effective in the treatment of this disease. The original observation must be accredited to the United States investigators, but other scientists armed with this knowledge then proceeded to extract and isolate the pure chemical vitamin which was responsible for effective treatment.

Professor Dodds has drawn an illuminating analogy to emphasize the importance of the new original discovery. He likens the gradual accumulation of scientific knowledge to the haphazard arrangement of furniture in a darkened room, presenting obstacles to the scientist who tries to find his way about. It is not until someone discovers and turns on the light that everything can be arranged in a logical order. The light switch may even be located in an area quite remote from the darkened room.

If the thesis is correct that the potential to develop and encourage original research in this country, which has a most enviable record, has become less than in the past then just how can this situation be corrected? It appears impossible for a committee to select suitable candidates from the usual type of research application. The suggested establishment of Putterships instead of Fellowships for those who wish to simply putter about in a lab in the hope of discovering something seems somewhat exotic, and not too acceptable. The university environment would seem, however, to be the most logical locale to judge and select the rare candidate whose talents appear to be the best suited to pursue original research. This could result in the support possibly of an individual and not necessarily of a particular project. Possibly, funds might be provided from research sources for the establishment of a few persons or groups working in university areas in Canada. If such groups become a reality, it might be cautioned that one should not expect too much from them. Original discoveries are made only rarely under the best circumstances.

The problem is obviously not easily solved, but I think it is of importance to all Canadians, for, unless it is solved, the research that was will not continue as the research that is.

* * *

Some recent statistics about biomedical research in Canada are as follows:

Funds allotted to the Medical Research Council of Canada increased 9.9% in 1970, 5% in 1971, 2.5% in 1972. That last figure is not even keeping pace with the most conservative figures on inflation and sophisticated research materials and equipment does not inflate at very conservative rates. The $40 million allotted is one-quarter the per capita allotment granted the U.S. National Institutes of Health. Three years ago, 1,400 grants were funded across Canada, last year it was 1,200, even though the number of applications is increasing steadily. It is not really a question of public apathy to research either, since the bulk of the $4.5 million annually spent on Canadian Cancer Research comes from private donations.

* * *

My doctor has made a prognosis
That intercourse fosters thrombosis
But I'd rather expire
Fulfilling desire
Than abstain, and develop neurosis.

Thanks to *"Interface", U. of Sask Medical Journal*

The Tragedy of Paracelsus

Neil H. McAlister

I know I am a man who does not say things that please everyone, and I am not used to giving submissive answers to arrogant questions. I know my ways, and I don't want to change them, nor could I change my nature if I wanted to. I am a rough man, born in a rough country. I was brought up in pinewoods, and may have inherited some knots. What seems to me polite and amiable may appear unpolished to another, and what is silk in my eyes may look like homespun to you.[1]

In such an age as our own, a time when everyone despises hypocrites and 'put-ons' and the Coca-Cola company accordingly extols its wares as The Real Thing; when Jerry Rubin urges us to 'Do It'; when the supreme virtues are to 'be yourself' and to 'do your own thing', and when a polite gesture such as holding a door open for a young lady is often considered to be slightly effete, people tend to find smug self-satisfaction even in their faults. These words, therefore, have a distinctly contemporary ring. They were written, however, in the sixteenth century by a man with the unlikely-sounding name of Philippus Theophrastus Bombast von Hohenheim, known more conveniently as Paracelsus. He was a rough-hewn character, proud of his peasant traits, unversed in the ways of the world, adept at the easy art of making enemies, a philosopher, chemist, conjuror and physician, a genius, an incorrigible iconoclast, a good and compassionate man, and in some respects a despicable wretch.

He was also without doubt one of the most paradoxical and exasperating individuals who has ever walked the earth. In his life he was utterly uncompromising. His unbending atitude was to be the source of both his fame and his infamy.

Paracelsus was a great man, a man whom we can admire, partly because of his absolute self-confidence: he refused to be intimidated by important people who controlled the church, state, and guild of his day. Indeed, his opinion of bureaucrats, pundits, and academicians endears him especially to the modern heart: he called them "high asses". He was never over-awed by the almost sacred platitudes held by his contemporaries to be immutable truths. Paracelsus became, in William Osler's phrase, the "Luther of Medicine": "the very incarnation of revolt. At a period when authority was paramount, and men blindly followed old leaders, when to stray from the beaten track in any field of knowledge was damnable heresy, he stood out boldly for independent study and private judgement."[2] "Boldly" is hardly the appropriate word: Paracelsus was not so much a confident and decisive man as, in Robert Browning's description, "a man possessed by a fire", by a demon.[3] His name has remained shrouded with uncertainty and legend. It was said that he could converse with spirits at will, and that he had a pact with the devil. Probably the legendary Paracelsus was one of the prototypes for the composite character of Dr. Faustus, though the real Paracelsus might better be described as an occult philosopher.[4]

But a man who makes no special effort to be 'amiable and polite' has few friends, and if he, like Paracelsus, is outrageously conceited besides, he tends to acquire numerous enemies. It is thought that Theoprastus took the name 'Paracelsus' in deliberate allusion to Celsus, the famous physician of antiquity. Although an adequate sense of self-importance is a necessary part part of a scholar's equipment, the more to add weight to his convictions, some of Paracelsus' writings come smashing down like the proverbial ton of bricks:

> From the middle of this age the Monarchy of all the Arts has been at length derived and conferred on me, Theophrastus Paracelsus, Prince of Philosophy and Medicine. For this purpose I have been chosen by God to extinguish and blot out all the fantasies of elaborate sophistry, of delusive and presumptuous work. My doctrine, proceeding as it does from the light of nature, can never, through its constancy, pass away or be changed; but in the fifty-eighth year after the millenium and a half, it will then begin to flourish . . . I shall put forth leaves, while you will be dry fig trees.[5]

The style has helped fix the word "bombast" in the English language. Many people believe that the word is derived directly from the family name of Paracelsus. It is scarcely surprising, then, that Paracelsus was the target for considerable abuse, both during his lifetime and after his death. Thomas Fuller's *Holy and Profane State*, written in 1641, showed Paracelsus to be the archtypical drunken quack: "He was never seen to pray, and seldom came to church. He was not only skilled in natural magic (the utmost bounds whereof border on the suburbs of

hell) but is charged to converse constantly with familiars. Guilty he was of all vices but wantonness."[6] Paracelsus has periodically received a 'bad press' ever since. On the fourth centenary of his death, one writer described him as "a rude, circuitous obscurantist, not a harbinger of light, knowledge and progress."[7]

Paracelsus certainly was rude—he was also truculent, opinionated, and downright arrogant. Had he acquired humility, he might have been more successful in getting his ideas across; but then, had he been more humble, he might never have dared to express his opinions, so different they were from the accepted doctrines of his day. What, then, was the nature of these fearsome opinions, so blasphemous that they aliented Paracelsus from the church, the civil authorities, and his professional colleagues?

The son of a doctor, young Theophrastus decided to adopt the same career, and accordingly went to Italy to study medicine. Somewhere during the course of his schooling, however, he came to the conclusion that his studies in orthodox medicine were irrelevant and meaningless. He became guilty of the heresy of doubt: "When I saw that nothing resulted from their practice but killing and laming, that they deemed most complaints incurable, and that they administered scarcely anything but syrup laxatives, purgatives, and oatmeal gruel, I determined to abandon such a miserable art and to seek truth elsewhere."[8] Theophrastus, just like many modern-day students, found the universities haunted by the stifling spirit of scholasticism. Books, not nature, were in the forefront of every discussion; authorities such as Avicenna and Galen were constantly cited, to the complete exclusion of investigation and observation.

If the universities could not teach him what he wanted to know, there were barber-surgeons, craftsmen, sorcerers, miners, old women, clerics and laymen who could. Every old-wives' tale or home remedy surely had some natural basis, and Theophrastus was never too proud to learn from anyone. How strange that this earnest young man, to whom professional arrogance was abhorrent, would later bill himself as the supreme authority, the "Prince of Philosophy and Medicine!" What tragic irony!

His inquiring mind led Theophrastus on a journey of discovery that continued, with short interruptions, until his death. His wanderings led him throughout Italy, to France, Spain and Portugal, to England, Scotland and Ireland, to Scandinavia and then east to Lithuania and Poland. He also visited Hungary, Rumania, Croatia, and he travelled as far east as Constantinople, Crete and Alexandria. He covered a tremendous territory, considering the appalling state of roads and communications during the 16th century; Paracelsus was one of the best-travelled men in the world.[9] All the while he learned from every source, collecting remedies, treating the sick if he could, sometimes teaching to earn a living, and slowly developing philosophies that were radically different from those that had been taught to him in the universities . . .

In the sixteenth century, most diseases were treated with drugs, and physicians still applied Galen's *materia medica,* somewhat fortified with Arabic drugs. Compound remedies, containing more than twenty ingredients, were often used. Paracelsus, by contrast, opposed this "polypharmacy": "apothecaries are my enemies because I will not empty their boxes. My recipes are simple and do not call for forty or fifty ingredients. I seek not to enrich the apothecaries, but to cure the sick."[10] The numerous elements of complicated concoctions, he continued, were at best ineffective since they often neutralized each other. At the worst they created further complications, a prospect that was abhorrent to Paracelsus:

> The best of our popular physicians are the ones who do the least harm . . . A physician should be the servant of Nature, not her enemy; he should be able to guide and direct her in her struggle for life, and not throw, by his unreasonable influence, fresh obstacles in the way of recovery.[11]

He believed that a physician ought to administer drugs only in extreme emergencies, then giving only one effective agent for one particular problem. In his stance against polypharmacy, Paracelsus was, in essence, the first doctor to warn against the "shotgun" approach to treatment. Paracelsus never missed the opportunity to visit hot springs and mines in the areas he visited, and his growing experience in the field of chemistry led him to apply metals and other mineral drugs such as sulphur, antimony, mercury, copper, iron and lead. The fact that his treatment was frequently at odds with Galen and the predominating pathology based upon the four "humors" merely convinced Paracelsus all the more that the orthodoxies were wrong, for he was without doubt a good doctor who achieved impressive results where others had failed.

After about ten years of wandering throughout Europe Paracelsus had become so famous that it appeared he was about to embark upon a respectable and profitable career. But through pride and tactlessness

the unfortunate man changed triumph into disaster, as the following account from the *Biographie Universelle,* published in Paris in 1822, and translated by Robert Browning, shows:

> The period of his return to Germany is unknown: it is only certain that, at about the age of thirty-three, many astonishing cures which he wrought on eminent personages procured him such a celebrity, that he was called in 1526 . . . to fill a chair of physic and surgery at the University of Basil. There Paracelsus began by burning publicly in the amphitheatre the works of Avicenna and Galen, assuring his auditors that the lachets of his shoes were more instructed than those two physicians; that all Universities, all writers put together, were less gifted than the hairs of his beard and the crown of his head; and that, in a word, he was to be regarded as the legitimate monarch of medicine. 'You shall follow me,' cried he, 'you, Avicenna, Galen, Rhasis, Montagnana, Mesues, you, gentlemen of Paris, Montpellier, Germany, Cologne, Vienna, and whosoever the Rhine and Danube nourish; you who inhabit the isles of the sea; you, likewise, Dalmations, Athenians; thou, Arab; thou, Greek; thou, Jew: all shall follow me, and the monarchy shall be mine.'
>
> But at Basil it was speedily perceived that the new Professor was no better than an egregious quack. Scarecly a year had elapsed before his lectures had fairly driven away an audience incapable of comprehending their emphatic jargon.[12]

Paracelsus took care to deliver his denunciations of the old authorities in the vernacular, instead of the conventional Latin, which to the local doctors made his heresy seem even more heinous. His students, far from eagerly embracing the new attitudes of questioning and investigation, were "driven away" from Paracelsus' lectures, alarmed at his unconventionality which might jeopardize their careers. Just like their twentieth-century counterparts, when their own interest was at stake they proved to be a surprisingly conservative lot. The town fathers were anxious to be rid of Paracelsus, who was becoming an embarrassment to local dignity, and they simply refused to pay the new professor any salary. No doubt they were much relieved when Paracelsus left Basil in bitterness. The academic minds of Europe were not prepared to listen to a conceited, self-styled Messiah who, having received most of his education from quacks, charlatans, barbers and worse, nevertheless presumed to be the monarch of medicine and despised the very foundations of decent learning. In vain did Paracelsus try to explain his position:

> "My accusers complain that I have not entered the temple of knowledge through the right door. But which one is the truly legitimate door—Galen and Avicenna, or Nature? I have entered through the door of Nature. Her light, not the lamp of an apothecary's shop, has illuminated my way."[13]

No one was interested.

Paracelsus then resumed his travels, for his egotism and bluntness made it practically impossible for him to find anywhere to settle. His constant torrent of invectives against the medical fraternity, made more biting by the disaster at Basil, did little to endear him to his colleagues. Defeated and disillusioned with a world blind to progress, Paracelsus withdrew into his own thoughts. In lonely introspection Paracelsus began to formalize and systematize his ideas, and slowly something consistent emerged—an all-embracing, unifying, mystic principle in the light of which medicine, philosophy, chemistry, magic, theology, all the sciences and all the arts were one. The principle was the light that had always guided him, the appreciation and understanding of Nature. Paracelsus, though by his own assertion "unpolished", was not ignorant He was well acquainted with the formal philosophy of his time. But he proclaimed himself to be an initiate to a higher philosophy, one that is not merely empty words and petty games of logic played according to pedantic rules. The philosophy of Paracelsus is *operative,* a truth which once grasped allows us to transmute nature and heal men. A system that aspires to transform and manipulate nature is necessarily "occult", since it attempts to do what is commonly known to be "impossible". But it is not occult in the sense of magic formulae, or jealously-guarded secrets, or dusty tomes; Paracelsus' philosophy will be intuitively understood by those who have achieved a sufficient degree of spiritual preparation and attunement to the cosmic order. To such a mind as Paracelsus had, it becomes the "light of nature" itself, the voice of the universe: "It is understood by the eye, it roars like the falls of the Rhine, it is the sound of philosophy which is like that of the strong wind from the sea!" This is no dark mystery meant only for a small clique of adepts. This philosophy exists for the transformation of mankind, for visible results—a "working truth".[14] Although Paracelsus was by the very uniqueness of his ideas an "occult" philosopher, and although he was accused of the blackest witchcraft, he was no necromancer or sorcerer as his enemies falsely claimed. In reality Paracelsus was quite sensible:

People have neglected to study secret forces and invisible radiations. Nature has, within itself, forces visible and invisible, bodies visible and invisible, and all are natural.[15]

Does this sound like the raving of a Dr. Faustus? Perhaps Paracelsus was simply ahead of his time. We who revel in scientific accuracy, in exact amounts and precise calculations, in concrete diagnosis and prescribed treatments, whose professional organizations are generally suspicious of new concepts; we who indoctrinate children with book-learning from five years of age, would be well advised to ponder the prospect that all the principles which will someday guide us to new discoveries cannot necessarily be found at this moment in the Library of Congress. Some of nature's forces remain as mysterious as they were in the sixteenth century. After all, what is gravity?

The most inspiring of Paracelsus' works was a treatise on the philosophy of medicine, called enigmatically the *Volumen Paramirum,* a title coined by Paracelsus meaning "Beyond the Marvellous".[16] The *Volumen Paramirum* discusses five "spheres" that govern man in health and disease. Man is a microcosm, a replica in small scale of what the world (macrocosm) is in larger version.

The *ens astrale* is the first sphere. As the stars move according to laws, so does man's life. Somewhat as in astrology, the constellations characterize a given moment, and every person has his moment in regards to good or ill health. Though superficially foolish, this is in fact a rather clever thought, since it introduces historical perspective into the concept of illness. A person living now is exposed to diseases much different from those that afflicted people four hundred years ago. Furthermore, we should note that Paracelsus was no astrologer. While he thought that human affairs and celestial affairs were arranged in a similar manner, he emphasized:

"Stars force us to nothing, they influence not, nor do they incline us; they are free on their own and so are we."[17]

Man, part of nature, has a physical environment from which to derive the material to sustain life. Also from nature come poisons and disasters. Thus, every material thing can be both good or evil—in proper dosages a remedy, but in excess an agent of death. This is the second sphere, or *ens veneni.*

Although all contemporaries are in more or less the same *ens astrale,* the stars "influence not" to any specific degree, hence the differences between individuals. Each man carries within himself his own destiny, or a large measure of it, and thus is explained the third sphere, the *ens naturale.*

The one characteristic that separates man from all the other animals is his spirit, the *ens spirtuale.* Man can remember the past, contemplate the future, and hence direct his destiny with more precision and guidance than the lower creatures.

Paracelsus' claim that we are free on our own was a heretical thing to say during the sixteenth century. Any good Christian would have disagreed violently, emphasizing that God has ultimate power over our actions. Paracelsus nicely sidestepped any such criticism by including in *Volumen Paramirum* a fifth and supreme sphere, the *ens Dei,* or God. Actually, all evidence indicates that Paracelsus remained a devout Christian all during his life, and although he made a valiant effort to reconcile his pagan beliefs with his Christian ones in *Paramirum,* he probably was never able to do so to his own satisfaction. After all, the very nature of his occult philosophy was "diabolical" and wicked according to most church authorities.

This work, though an epic, was never published during the lifetime of Paracelsus. He was a prolific writer, but it was only seldom that he could persuade anyone to print one of his books, so discredited he became. The *Chirurgia Magna* (the Great Work of Surgery) was one of the few works that he saw come to press, and it created much enthusiasm in medical circles, unexpectedly boosting Paracelsus into the limelight for a brief period. But he quarrelled with other doctors, once more proclaimed himself the greatest physician of history, and having alienated all influential people within earshot, fell from favour and esteem yet again. In the final analysis, Paracelsus had very little immediate impact on the progress of science; his renown for many years after his death was that of a clever magician. Why is it that one of the greatest thinkers of the sixteenth century could have so little influence upon his contemporaries? Why did his brilliant ideas fail to produce a tremendous impact?

The story of Paracelsus is that of a tragically paradoxical person. He was a man laudable for his genius, yet despicable for his arrogance; intellectually admirable, but personally revolting. Though he was clever, his ignorance and ineptitude in human relations were truly appalling, and continuously stood in the way of much good that he might have done. Paracelsus cared for mankind in a way that few before him had cared—he once wrote that the basis of medicine was "love". Yet he was impatient

and intolerant of most men, who thoroughly disliked him in return. On a surge of ideas that might have brought new light into the world Paracelsus rose to positions of fame and influence, only to be dragged back into the dark pit of disrepute by his demon, hubris. Paracelsus possessed tools that could have revolutionized the world in the hands of a more skilful man, but he himself could not use them.

The sin of Paracelsus was that he expected too much of people, too soon. He tried to bring his contemporaries from an age of absolutism and belief into an era of dissent and enquiry, and in the process he left almost everyone behind, becoming an outsider, a man ahead of his time. Worse, Paracelsus did not know himself. The concept of a constantly-changing world in which nothing was eternal, and in which there were no earthly authorities was too horrible a concept for any sixteenth-century man—even Paracelsus. Having torn down the old idols, and having destroyed the old philosophies, he was left with a moral vacuum, in which he personally had to become the new authority, the "Prince of Philosophy and Medicine". The new order had to be his doctrine, irrefutable and changeless. Thus a great man shrunk to the ridiculous proportions of a self-proclaimed saviour and a quack.

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Bon Mots from the Lectern

or listening to second year med. lectures

recorded by Ann Aldis

I think you've had a lesion—I mean a lecture—on this previously. *(Wallace)*

And now some GEE WHIZ facts. *(Bondy)*

I like to think that that Scandinavian blonde sneezed at me. *(Hatch)*

As we go deeper into the female genital tract the lectures will become more interesting. *(Ramzy)*

I'm going to show you a tape recording. *(Kertesz)*

TABES DORSALIS:

It's been eliminated by moral reform and penicillin, and I miss it. *(Barnett)*

THE AORTIC ARCH:

You know, the arch of the aorta. *(Lewis)*

A FIBROMA:

It looks like a fibroma, feels like a fibroma and under the mike it is a fibroma. *(Ramzy)*

WHEN SOMETHING IS RARE:

Only two at University Hospital per year. *(Bondy)*

THE CONNECTIONS OF THE HYPOTHALAMUS:

They're in every good textbook, especially Dr. Barr's. *(Montemurro)*

SYPHILITIC GUMMA OF THE TESTIS:

It's as rare as rocking horse crap. *(Troster)*

THE SECOND DIGIT:

But if we say that it's the thumb, by God it is the thumb!! *(Barnett)*

SUDDEN DEATH:

It's pretty abrupt. *(Barnett)*

A VICIOUS EVIL AFFAIR:

An aneurysm. *(Drake)*

A PRE-CANCEROUS LESION:

The female breast. *(Mills)*

I'd like to show you this table which shows a few points that were clear up until five or six years ago. *(Cheevers)*

The only proper place for an isolated breast lump is in a bottle of formalin. *(Wallace)*

An Elective in the Pacific Northwest

Michael J. Austin, '74

Following the age-old admonition of Horace Greeley to "go west young man", I spent two months this past summer in Prince Rupert, British Columbia. This interesting and valuable learning experience was arranged through the University of British Columbia's Continuing Medical Education Department.

The programme offered at the Prince Rupert Regional Hospital caught my eye for several reasons:

1. It offered a learning experience in a small town setting (by London's standards) and this appealed to me since I am planning to practice in a smaller centre. Moreover, I was contemplating practising in British Columbia and thought an elective there would help me learn the political ropes of their medical insurance plan, etc.

2. The programme there was basically unstructured but general practice oriented.

3. I enjoy the west, in general, and British Columbia in particular, very much, partly from personal experience (I had spent the previous summer landing on the top of mountains in the Coast Range for the federal government) and partly from my upbringing, since my father was born there.

4. The description of the programme hinted at the chance to participate in air-sea rescue and the like and this, plus the fact that the town itself was surrounded by a vast area that is largely wilderness, appealed to my spirit of adventure.

Thus it was that on June 16th that my wife and I turned our intrepid little Pinto westward. Eight days and three thousand miles of forest, prairie and mountain later we arrived at our destination.

For the uninitiated, Prince Rupert is a city of 17,000 persons located on the Pacific coast near the mouth of the Skeena River about 400 miles northwest of Vancouver (as the Raven flies). The city is located a scant 30 miles from the southernmost tip of the Alaska panhandle and on a clear night the northern horizon is dominated by the low hills of the 49th state.

Industrially, Prince Rupert is like all of the cities of the province as it relies very heavily on natural resource-related industries: a large commercial salmon fishery and innumerable canneries, a lumber mill and a pulp and paper mill. Prince Rupert also has a very active tourist industry, being at the meeting point of important north-south and east-west transportation arteries. Since a third of the city's population is Haida Indian, the city is proud of its native heritage and boasts gift shops with native crafts, a fairly extensive museum featuring native artifacts, and totem poles galore in all of the city's numerous parks.

The city has eleven doctors: one obstetrician, three general surgeons and seven general practitioners who serve an area of about 22,000 people. Since the area is obviously underserviced, the general surgeons often are forced to wear the hat of the general practitioner in some cases, much to their chagrin. The majority of the town's physicians are arranged in three clinics headed by the general surgeons who, because of the large turnover of general practitioners in the town over the last few years, are by and large the senior physicians in town.

They all work out of Prince Rupert Regional Hospital, a beautifully modern and well-equipped 140 bed hospital built in 1969. It has a very scenic location perched atop the town's highest hill and overlooks the harbour, the mountains, three totem poles in the city park directly across the street and the most beautiful sunsets in Canada.

From the outset, the informality of the hospital staff impressed us and made us feel at home despite our isolation from places familiar. The first night the programme co-ordinator took us to his home for supper in his camper truck. My wife and I lived directly across from the hospital in a three-bedroom furnished apartment which the hospital ran as a nurses' residence. The accommodation was complete with a view similar to that from the hospital itself and one or two tame deer. We were provided with a telephone and free meals at the hospital. The proximity of the room to the hospital was excellent as one could just dash across the street for an emergency or a delivery.

My mornings were usually spent at the hospital scrubbed for surgery. I was first assistant almost invariably and was given ample experience at knot tying and the like. I assisted, for example, at seven Caesarean sections and did one appendix which was

a gratifying, yet harrowing, experience which totally spoiled me for subsequent U.W.O. surgery training as third assistant. The mornings were usually hectic, culminating in rounds with one or more of the staff plus various outpatient procedures in the emergency department.

Afternoons were usually spent in various doctor's offices around town or else at the hospital either in emergency or else following up interesting patients whom the physicians informed me of. Visiting specialists occasionally came up from St. Paul's Hospital in Vancouver and I spent a few afternoons with a visiting ophthalmologist and paediatrician.

Evenings spent in emergency, especially on the weekend, were particularly rewarding. Friday and Saturday nights a hodge podge of reserve Indians, pulp and paper workers, construction and fishermen invariably went on a rampage in the entertainment sector of "Rupert's" main drag (affectionately known locally as "Apache Pass"). These would arrive later with various abrasions, contusions, and lacerations which the medical student is readily allowed to suture, reduce, or cast as he desires.

Although the hospital draws from a fairly small area, there is a good cross-section of pathology from the commonplace to the exotic. A wide spectrum of industrial accidents were commonplace in the emergency department and ranged from fish hooks imbedded in various parts of the anatomy, to traumatic tenosynovitis in fish cleaners, to workers crushed in logging or mining operations. On the exotic side were a true hermaphrodite delivered by C-section, a ruptured Echenococcal cyst, Turner's Syndrome and Polyarteritis Nodosa.

The regional hospital was largely self-sufficient, but if a case required constant monitoring or heroic and specialized treatment, they were taken by ambulance across the ferry to Digby Island and then flown by a waiting Air-Sea Rescue plane to Vaucouver. These were always exciting occasions with the big Buffalo aircraft waiting with motors running when the ambulance arrived. After delivering our patient into the capable hands of the two Canadian Forces medics who would accompany him to Vaucouver, the plane was off in a flash—hardly before the ambulance had left the runway.

Throughout my two months in Prince Rupert I was repeatedly impressed with the friendliness of the populace in general and the hospital's medical staff in particular, and with the informality of the programme. I was told the first morning in no uncertain terms that I was not to crack a book while in Prince Rupert—I was there to enjoy myself and that they would give me ample work to keep me busy during the day but that at night I was to relax.

Because of the amicability of my hosts and my ample free time I was able to sample what recreational facilities Prince Rupert had to offer. These are mostly "outdoorsy" pursuits since indoor recreation is indeed limited—two movie houses, one radio station by day and one television station which experienced periodic sustained blackouts since the transmitter was located on a nearby mountain which was frequently obscured by cloud and fog. I went salmon fishing one afternoon in the R.C.M.P.'s annual derby and caught nothing but one small cod and an Ethanol-induced headache. We followed another physician 160 miles up a logging road to his favourite picnic spot—his camper did admirably but our Pinto returned with two soft tires and a dented fuel tank. We drove up the Skeena for Sunday afternoon picnics—we ate the contents of the basket and the blackflies and mosquitos ate us. We also spent several afternoons tramping around Prince Rupert's nine hole golf course. This was constructed atop the city's sanitary landfill site. Unfortunately the city has not produced enough litter to build the back nine as yet. The fifth hole parallels the present dump and besides the interesting odours wafting in the cool, moist air, one is treated to a menagerie of creatures, both feathered and furred, who frequent the adjacent acres—Ravens, Bald Eagles and an occasional black bear on his way for a snack (which often prompts an untimely retreat for the sixth tee).

In retrospect, I was very pleased with my elective experience. I was impressed with the good standard of medical care delivered despite the remoteness of the city, the patient-doctor ratio and the lack of many diagnostic parameters considered "necessary" in the ivory towers of medical research. And I was very impressed with the willingness of the great majority of the city's physicians to take time to teach students the practical aspects of day-to-day practice.

Most of all, perhaps, I had impressed upon me time and again the need for more doctors in Prince Rupert. For those who shun the bright lights of the metropolitan centres of the south, who are interested in locating in a rapidly expanding small city which retains some of its frontier character, who enjoy the sea and the outdoors and who are willing to accept the limitations and challenges of a non-teaching environment, Prince Rupert would be an excellent choice.